Panasonic

4-Channel SIP Trunk Card

Installation Manual

Model No. KX-TDA3450

Thank you for purchasing a Panasonic 4-Channel SIP Trunk Card.
Please read this manual carefully before using this product and save this manual for future use.

In this manual, the suffix of each model number (e.g., KX-TDA3450**X**) is omitted unless necessary.

Table of Contents

1 Overview 5
1.1 Information about IP Telephony Service 6
1.2 Specifications 10

2 Installing in the KX-TDA15/KX-TDA30 PBX 11
2.1 Installation 12
2.1.1 Names and Locations 12
2.1.2 Installing the SIP-GW4 Card in the PBX 16
2.2 Cable Connection 18
2.2.1 LAN Port Connection 18
2.2.2 WAN Port Connection 20

3 Programming the SIP-GW4 Card 21
3.1 Procedure Overview 22
3.1.1 Procedure Overview 22
3.2 Preparations 23
3.2.1 Preparing the PC 23
3.2.2 Starting the SIP-GW4 Maintenance Utility 27
3.3 Programming—Network Settings 28
3.3.1 WAN Interface 28
3.3.2 LAN Interface 33
3.4 Programming—SIP Settings 34
3.4.1 Channel & SIP Telephony 34
3.4.2 Voice Communication 41
3.4.3 NAT Traversal 43
3.4.4 Options 45
3.5 Programming—Advanced Settings 46
3.5.1 DHCP Server 49
3.5.2 Static Route 51
3.5.3 IP Filter 52
3.5.4 NAT Settings 55
3.5.5 Bandwidth 60
3.6 Configuration Management 61
3.6.1 Backup (Download from SIP-GW4) 61
3.6.2 Restore (Upload to SIP-GW4) 62
3.6.3 Initialization 63
3.7 Maintenance 64
3.7.1 General Information 64
3.7.2 Channel Status 65
3.7.3 System Log (for engineers only) 67
3.7.4 Ping Test 68
3.7.5 Change Password 69
3.7.6 Firmware Upgrade 70
3.8 Others 72
3.8.1 Reboot 72

4 Programming the PBX 73

4.1 Programming the PBX 74

A Guidance for VoIP Installation 75

A1 Important Notice for Subscription and Installation..... 76

A1.1 Firewall Requirements..... 76

A1.2 Bandwidth Requirements 77

B Initialisation of the SIP-GW4 Card 79

B1 Initialising the SIP-GW4 Card..... 80

Index 81

Section 1
Overview

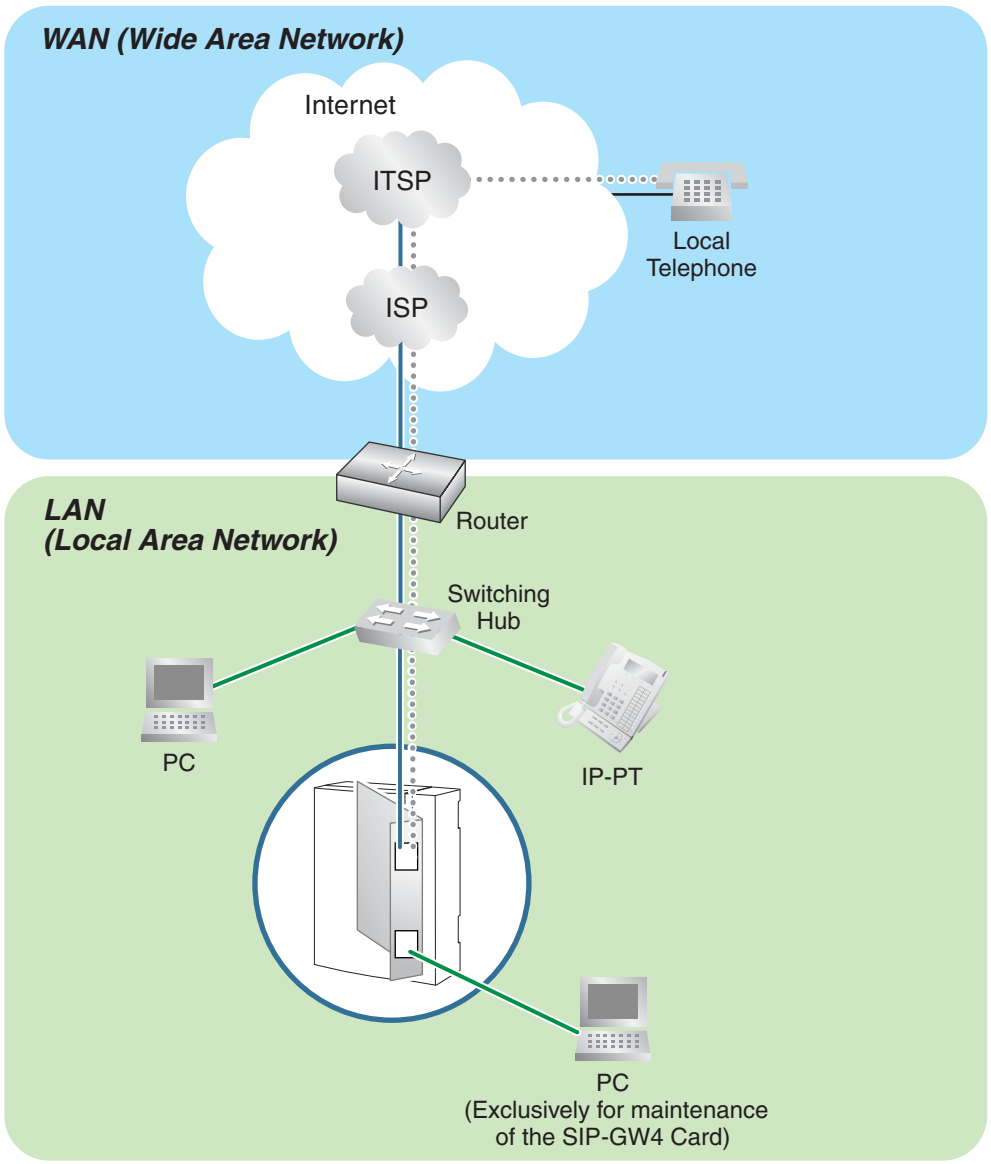
1.1 Information about IP Telephony Service

The KX-TDA3450 SIP-GW4 card is a trunk card which is designed to be easily integrated into Internet Telephony Service provided by an ITSP (Internet Telephony Service Provider). With VoIP technology based on the SIP protocol, the cost of voice communication can be much cheaper than conventional telephone networks.
Mounting the 4-channel VoIP DSP (SIP-DSP4) card on a SIP-GW4 card can enhance the channel capacity to a total of 8 channels.

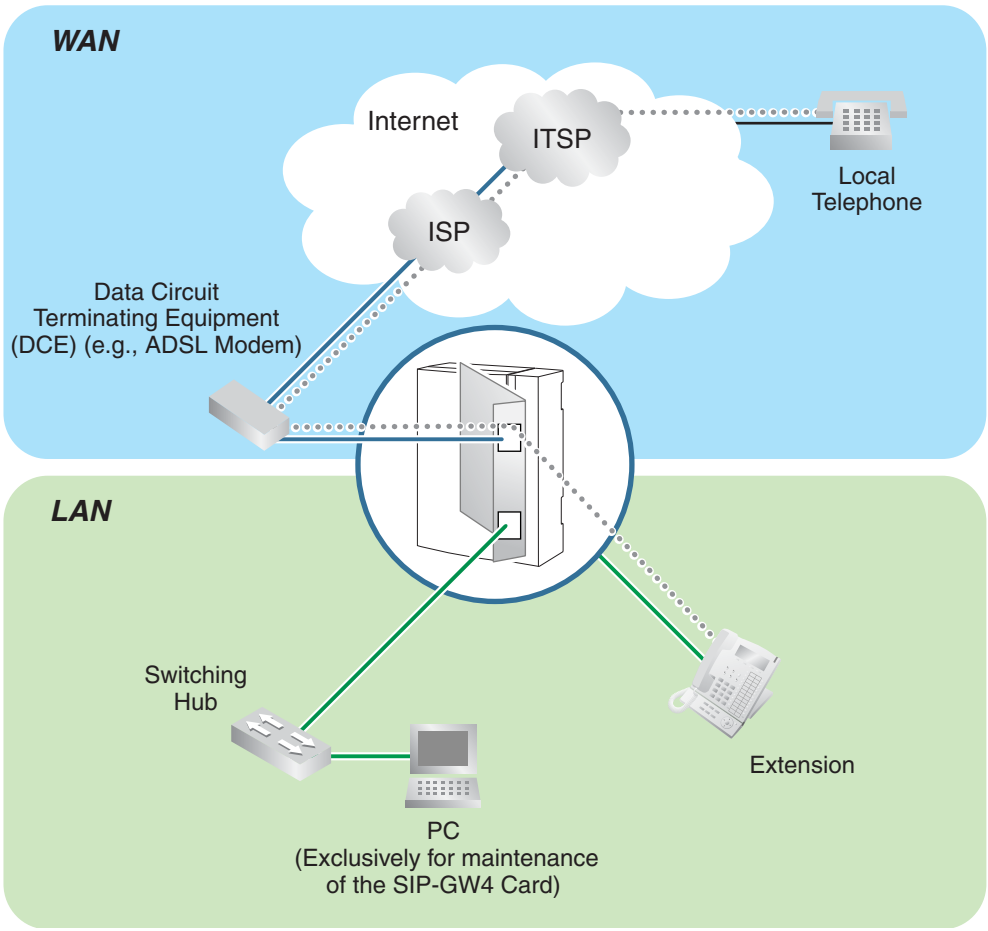
SIP-GW4 Connection Outline

The following diagrams illustrate simple VoIP networks connecting the SIP-GW4 card to the Internet or LAN.

[Diagram 1]



[Diagram 2]



Requirements for Internet Telephony Service

- You need to subscribe with an ISP (Internet Service Provider) for Internet connection.
- You need to subscribe with an ITSP for telephone connection. The ISP and ITSP may be part of the same company.

Notes

- The SIP-GW4 card may not function properly depending on the ITSP being used.
- The performance of the SIP-GW4 card may deteriorate depending on the network conditions.
- If you access the Internet from the PC connected to the LAN port of the SIP-GW4 card and send or receive large amounts of data, there may be an adverse affect on voice communication. In addition, for security reasons, it is recommended not to access the Internet from the PC connected to the card. Therefore, it is recommended to connect a PC exclusively for maintenance of the card to the LAN port of the SIP-GW4 card.

DNS (Domain Name System)

A DNS server normally provides the name resolution service for your computer. As domain names are alphabetic, they are easier to remember. The Internet, however, is based on IP addresses. Therefore, every time a domain name is used, a DNS server must translate the name into the corresponding IP address, and vice versa. For example, the domain name *www.example.com* may be translated to *192.0.34.166*. If one DNS server does not know how to translate a particular domain name, it asks another one, and so on, until the correct IP address is returned.

NAT (Network Address Translation) Traversal

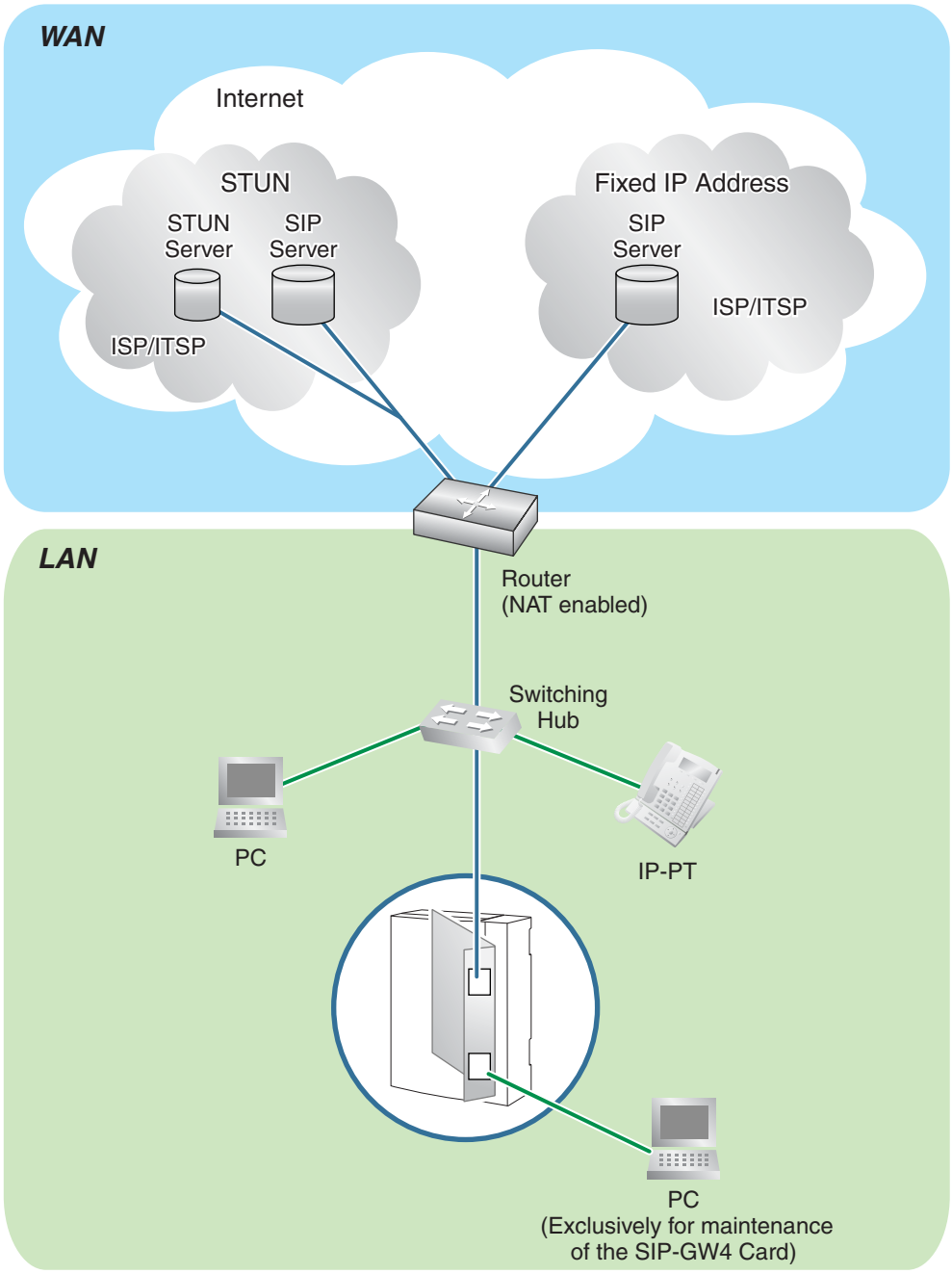
When NAT/NAPT (Network Address Port Translation) is enabled, the router translates a local IP address from the SIP-GW4 card into a global IP address. However, the router with NAT enabled does not translate local IP addresses stored in SIP messages into global IP addresses.

Therefore, the address which the SIP Server recognises as the destination IP address to reply to is actually the local IP address of the SIP-GW4 card, not the global IP address of the router. Therefore, if the SIP server receives a SIP message from the SIP-GW4 card and sends a message back to the SIP-GW4 card using the address stored in the SIP message, the packet information will not reach the SIP-GW4 card.

STUN Servers function to solve the global IP address problem under certain NAT conditions, for example, in case of full duplex communication. A STUN Server, used alongside the SIP Server, finds out the global IP address of the router with NAT enabled. With the STUN feature enabled, the packet information sent by the SIP Server is able to "traverse" NAT and reach the SIP-GW4 card.

The settings can be configured to specify whether to enable the NAT Traversal feature for each ISP/ITSP. In addition, the NAT Traversal method can be selected from “STUN” and “Fixed IP Address” (refer to 3.4.3 NAT Traversal).

The SIP-GW4 card may require the NAT Traversal feature to be enabled to connect to the WAN via a router. The following diagram illustrates how VoIP communication is enabled between the SIP-GW4 card and the SIP Server (SIP Receiver) via a router with NAT enabled.



Notes

- If an ISP/ITSP uses a device such as SBC (Session Border Controller), you may not have to enable the NAT Traversal feature.
- A STUN Server is supplied by an ISP/ITSP, and not included with the PBX.

1.2 Specifications

For details about the SIP-GW4 card, refer to the following specifications.

Items	Specification
LAN Interface	RJ-45 10BASE-T/100BASE-TX
WAN Interface	RJ-45 10BASE-T/100BASE-TX
Voice Channel	4ch (Max 8ch with SIP-DSP4 card)
SIP Accounts	Max 8
SIP RFCs	RFC3261 (UDP only)
	RFC3262 (PRACK)
	RFC3264 (Offer/Answer)
	RFC3311 (UPDATE)
	RFC3581 (Symmetric Response Routing/rport)
	RFC4028 (Session Timer)
CODECs	G.711 (a-law and μ-law)
	G.729AB
Voice Options	Echo Cancellation (64 ms)
	Jitter Buffer (100 ms)
	VAD (Voice Activity Detection)
	PLC (Packet Loss Concealment)
DTMF Relay	Inband/Outband (RFC2833)/Outband (INFO)
Protocol/Function	RTP
	RTCP
	PPPoE (WAN Port)
	DHCP Client (WAN Port)
	DHCP Server (LAN Port)
	DNS
	NAPT
	NAT Traversal (STUN)
	Port Forwarding
	QoS (ToS field setting in IP header of SIP/RTP/RTCP)
Maintenance	WEB-based Programming (LAN Port)

Section 2

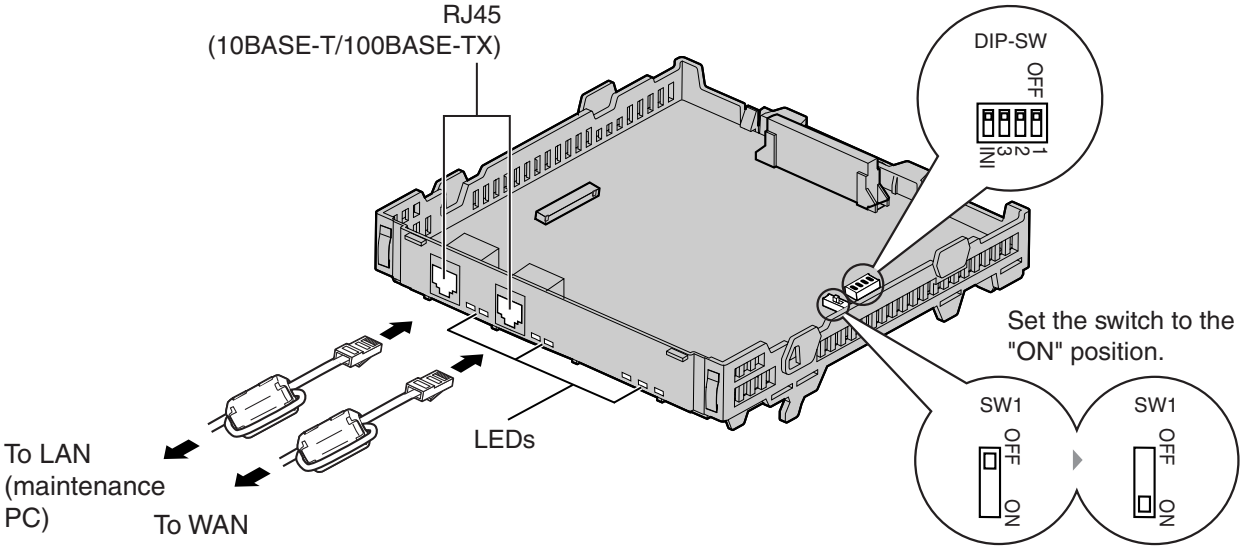
Installing in the KX-TDA15/KX-TDA30 PBX

This section describes the physical installation process of the KX-TDA3450 SIP-GW4 card covering the following topics: (1) installing the card in the KX-TDA15/KX-TDA30 PBX, and (2) connecting the card to a network device using a Category 5 (CAT 5) Ethernet cable.

2.1 Installation

2.1.1 Names and Locations

SIP-GW4 Card (KX-TDA3450)



Included Accessories

Ferrite Core × 2, Extension Bolt × 1, Strap × 1, CD-ROM (including documentation) × 1

Note

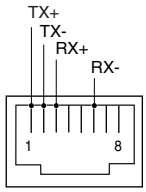
When connecting the RJ45 connector, attach the included ferrite core. Refer to "Attaching a Ferrite Core to an RJ45 Connector".

Switch Settings

Switch	Usage and Status Definition
SW1	Set the switch at "ON" position before installing the card in the PBX.
DIP-SW	Keep all DIP switches at default "OFF" positions.

Pin Assignments

RJ45 Connector (10BASE-T/100BASE-TX)

	Signal Name	Level [V]	Function
	TX+	(+)	Transmit data (+)
	TX-	(-)	Transmit data (-)
	RX+	(+)	Receive data (+)
	RX-	(-)	Receive data (-)
	–	–	Reserved

Indication Light (LED)

When the SIP-GW4 card is operating, each LED should show the status identified in **bold-face letters** under normal conditions.

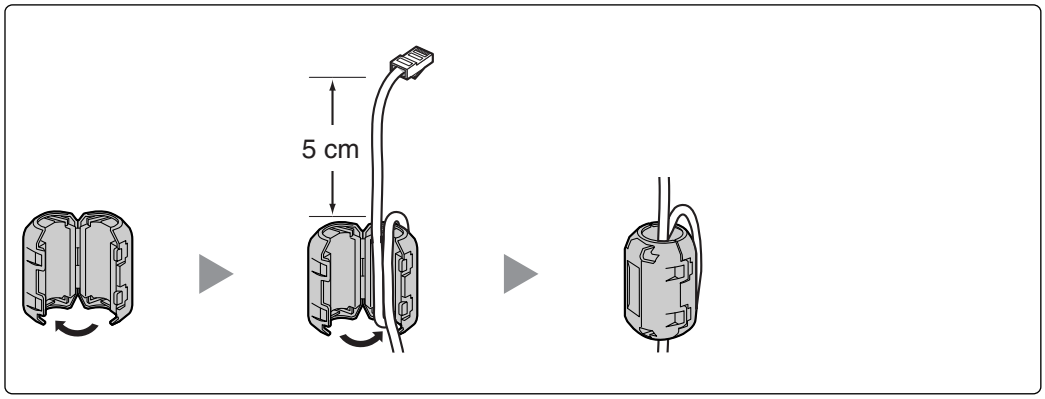
Indication		Colour	Description
RUN		Green	Card status indication • **ON: Normal** • OFF: Power Off
VoIP		Green	Voice data transmission status indication • ON: Registered on a VoIP server • OFF: Not registered on a VoIP server • Flashing: During a conversation
PPP		Green	Indication of whether a PPPoE session has been established with the IP telephone company • ON: PPPoE session established • OFF: PPPoE session not established • Flashing: PPPoE session establishment in process
WAN	LINK	Green	Indication of link status with connected devices (e.g., modem) • **ON: Normal connection** • OFF: Connection error
	100	Green	Indication of transmission speed with connected devices (e.g., modem) • ON: Operating at 100 Mbps • OFF: Operating at 10 Mbps • Flashing: Data transmitting (only when operating at 100 Mbps)

Indication		Colour	Description
LAN	LINK	Green	Indication of link status with connected devices (e.g., PC, hub) • **ON: Normal connection** • OFF: Connection error
	100	Green	Indication of transmission speed with connected devices (e.g., PC, hub) • ON: Operating at 100 Mbps • OFF: Operating at 10 Mbps • Flashing: Data transmitting (only when operating at 100 Mbps)

Attaching a Ferrite Core to an RJ45 Connector

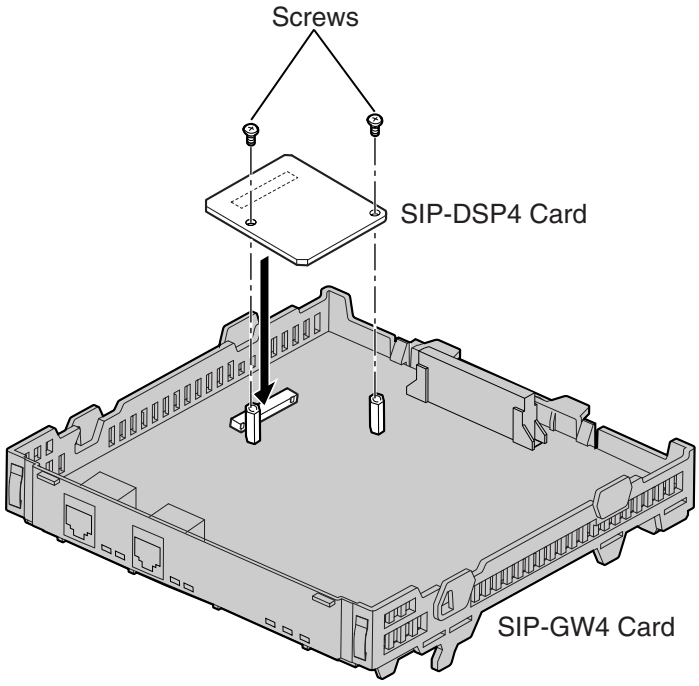
A ferrite core must be attached when an RJ45 connector is connected to the SIP-GW4 card.

Wrap the cable once around the ferrite core, then close the case of the ferrite core. Attach the ferrite core 5 cm away from the connector.



SIP-DSP4 Card (KX-TDA3451)

4-channel VoIP DSP card. To be mounted on the SIP-GW4 card.



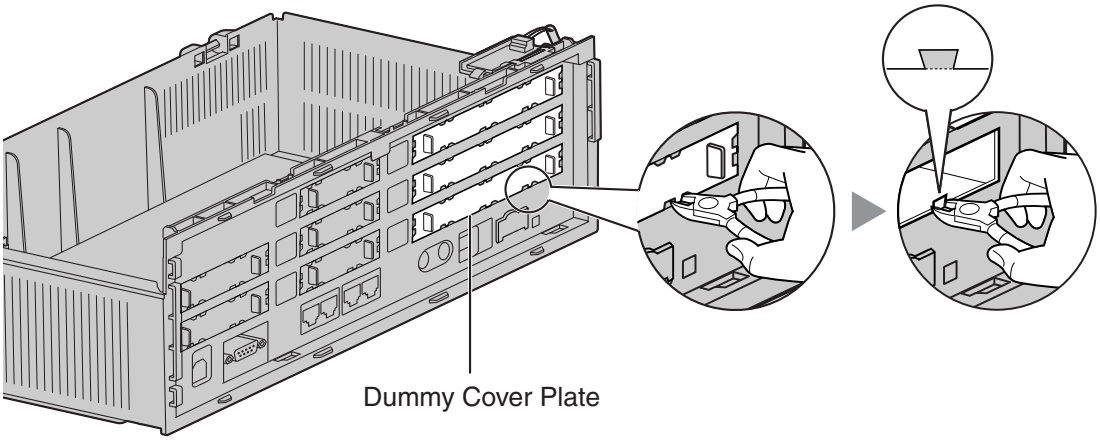
Included Accessories

Screws × 2

2.1.2 Installing the SIP-GW4 Card in the PBX

Install the SIP-GW4 card in slot 05, 06, or 07 of the PBX.

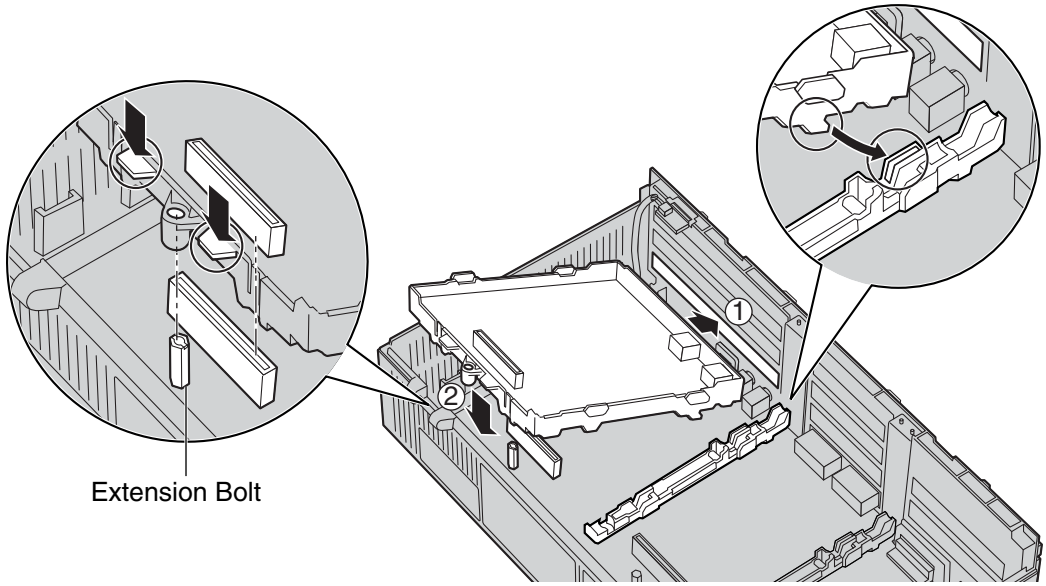
1. Before installing the card, cut and remove the dummy cover plate for the appropriate slot from the main unit.



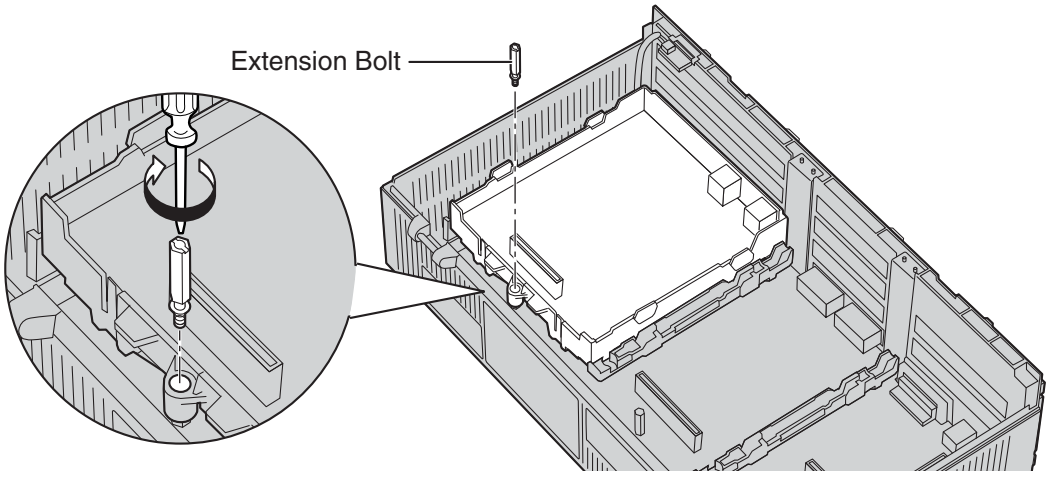
CAUTION

For safety reasons, smooth the cut edges after removing the dummy cover plate.

2. Position the card in the open slot, making sure that the tabs on both sides of the card fit into place. Then, holding the card firmly in place, lower the rear end so that the hole of the card fits over the extension bolt.



3. Insert the new extension bolt (included with the card) into the hole on the card, and tighten it to secure the card.



2.2 Cable Connection

Use a Category 5 (CAT 5) Ethernet cable (10BASE-T/100BASE-TX) with an RJ45 connector to connect the SIP-GW4 card to a network device.

Note

Use only CAT 5 Ethernet cable for connection.

2.2.1 LAN Port Connection

Connect the card to your PC or to a switching hub, following the steps below, and then specify an IP address.

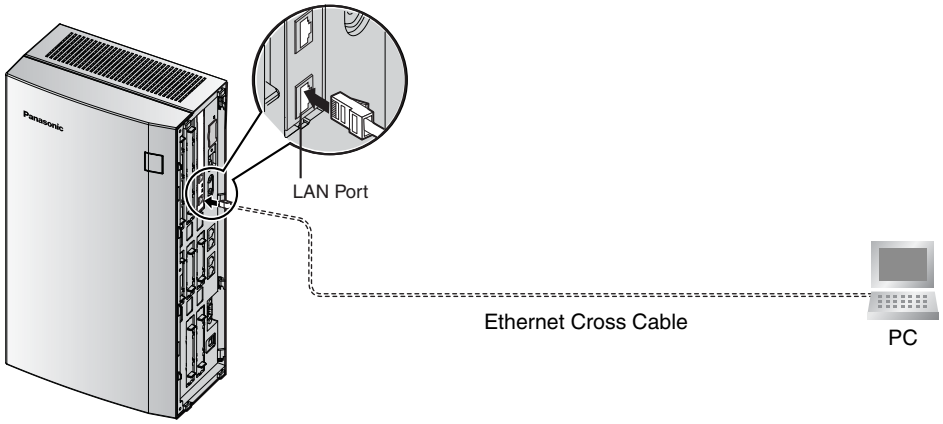
Note

The IP address of the SIP-GW4 card must be specified before connecting to the network. For details about the IP address setting, refer to "3.2.1 Preparing the PC".

Connecting to a PC

When connecting the card to a PC, use an Ethernet cross cable.

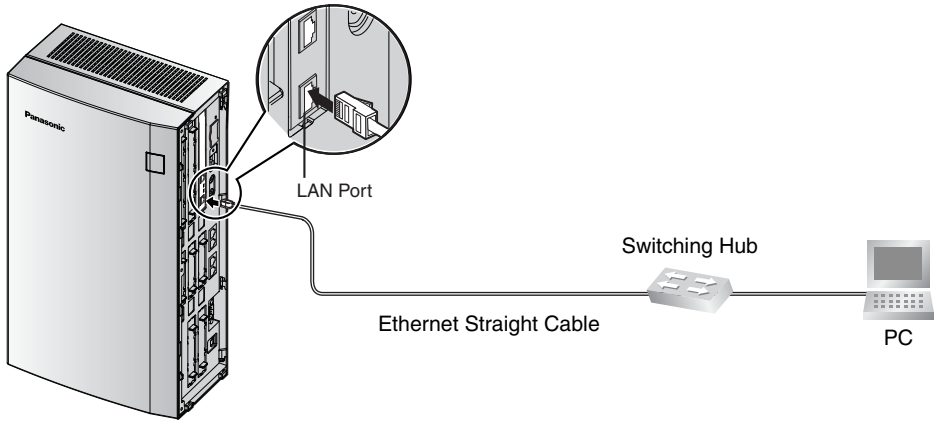
1. Connect the Ethernet cable to the LAN port of the card.
2. Connect the other end of the cable to the PC.



Connecting to a Switching Hub

When connecting the card to a switching hub, use an Ethernet straight cable.

1. Connect the Ethernet cable to the LAN port of the card.
2. Connect the other end of the cable to the switching hub.



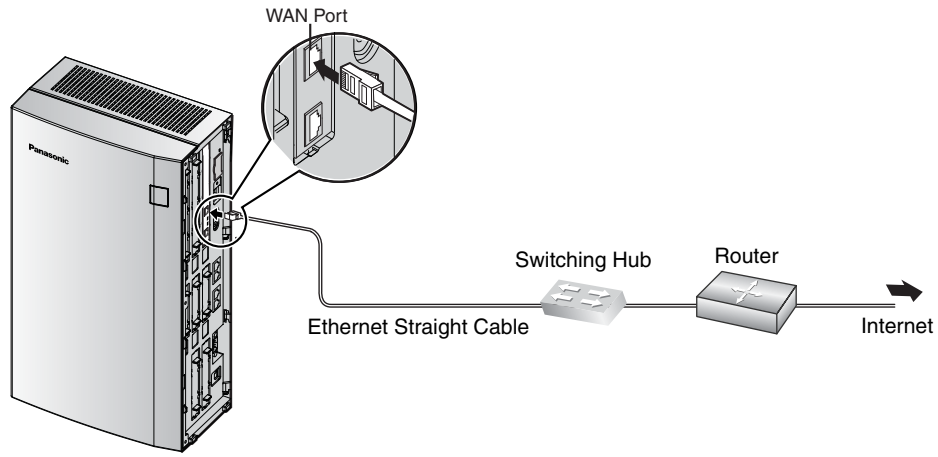
2.2.2 WAN Port Connection

Be sure to specify the IP address of the card before connecting it to the network.

Connecting to a Switching Hub

When connecting the card to a switching hub, use an Ethernet straight cable.

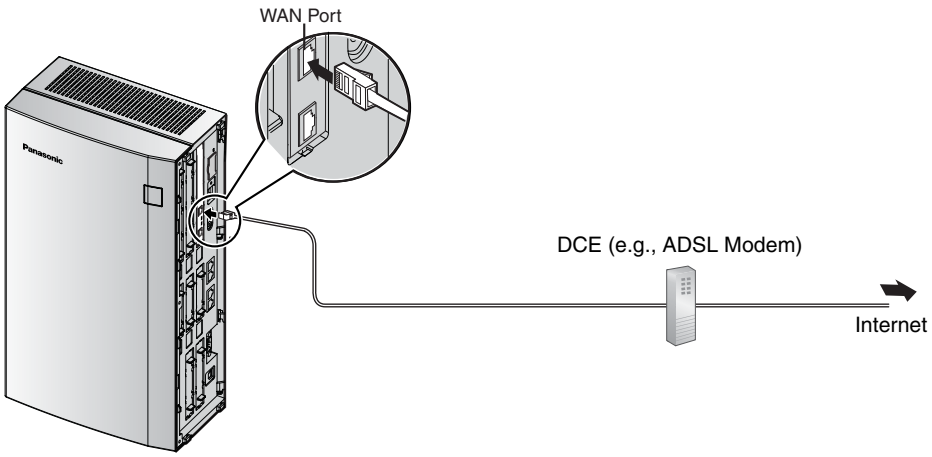
1. Connect the Ethernet cable to the WAN port of the card.
2. Connect the other end of the cable to the switching hub.



Connecting to Data Circuit Terminating Equipment (DCE) (e.g., ADSL Modem)

The type of Ethernet cable (Cross/Straight) to be used depends on the type of DCE. For details, refer to documentation for the DCE.

1. Connect the Ethernet cable to the WAN port of the card.
2. Connect the other end of the cable to the LAN port of the DCE.



Section 3

Programming the SIP-GW4 Card

3.1 Procedure Overview

3.1.1 Procedure Overview

Installing the SIP-GW4 Card

The following steps describe the start-up procedures when installing the SIP-GW4 card in the PBX for the first time.

1. **Install the SIP-GW4 card in the PBX**.
   → "2.1.2 Installing the SIP-GW4 Card in the PBX"

   Note

   Make sure that you have subscribed to the following for Internet connection:
   - Internet Service Provider (ISP)
   - Internet Telephony Service Provider (ITSP)

2. **Prepare the PC**.
   → "3.2.1 Preparing the PC"

3. **Connect cables to the card**.
   → "2.2.1 LAN Port Connection"
   → "2.2.2 WAN Port Connection"

4. **Set up the Internet connection**.
   → "3.3.1 WAN Interface"

5. **Set up the ITSP connection**.
   → "3.4.1 Channel & SIP Telephony"

6. **Specify other settings (if necessary)**.

7. **Program the PBX**.
   → "4.1 Programming the PBX"

8. **Back up the configuration file of the SIP-GW4 card**.
   → "3.6.1 Backup (Download from SIP-GW4)"

   Note

   After you have confirmed that the card has been successfully programmed, make sure to download the configuration file from the card and save it on your PC for backup and archive purposes.

3.2 Preparations

A web programming utility called the SIP-GW4 Maintenance Utility is available for programming of the SIP-GW4 card.

System Requirements

- Microsoft® Windows® 98, Windows Me, Windows 2000 Professional, Windows XP Professional SP2, or Windows XP Home Edition SP2
- Microsoft Internet Explorer® 6.x

Trademarks

- Microsoft, Windows, and Internet Explorer are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.
- All other trademarks identified herein are the property of their respective owners.
- Microsoft product screen shot(s) reprinted with permission from Microsoft Corporation.

Copyright for MD5

This software uses the Source Code of RSA Data Security, Inc. described in the RFC1321 (MD5 Message-Digest Algorithm).

Copyright (C) 1991-2, RSA Data Security, Inc. Created 1991. All rights reserved.

Licence to copy and use this software is granted provided that it is identified as the "RSA Data Security, Inc. MD5 Message-Digest Algorithm" in all material mentioning or referencing this software or this function.

Licence is also granted to make and use derivative works provided that such works are identified as "derived from the RSA Data Security, Inc. MD5 Message-Digest Algorithm" in all material mentioning or referencing the derived work.

RSA Data Security, Inc. makes no representations concerning either the merchantability of this software or the suitability of this software for any particular purpose. It is provided "as is" without express or implied warranty of any kind.

These notices must be retained in any copies of any part of this documentation and/or software.

Note

The screen may not be displayed properly when Internet Explorer settings have been changed. In that case, confirm the settings as follows:

The example below is based on the Windows XP operating system:

1. Confirm that the display properties DPI is set to 96 DPI. If not, restore the default setting (96 DPI).
2. Click **Internet Options** from the **Tools** menu. Select the **General** tab, and click **User Assistance**. Confirm that each check box is not checked for **Format Setting** on the **User Assistance** screen.

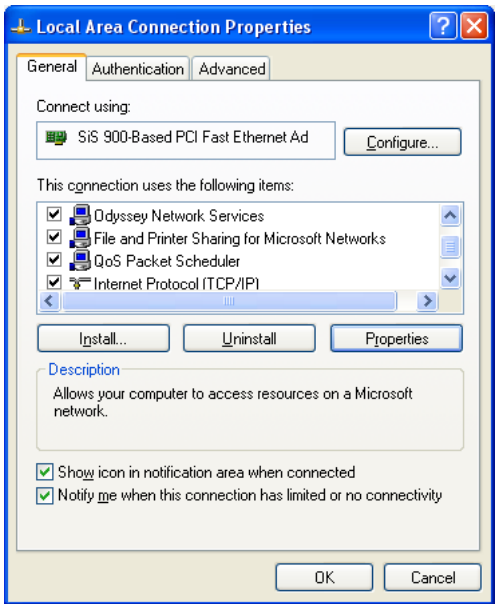
3.2.1 Preparing the PC

To prepare for programming using the SIP-GW4 Maintenance Utility, configure your PC by (1) assigning an IP address and a subnet mask address for the same network as that of the SIP-GW4 card, and (2) choosing the appropriate options for Internet properties.

Note

The procedures vary depending on the operating system of the PC.
This example is based on the Windows XP operating system.

1. Open **Control Panel** from the **Start** menu.

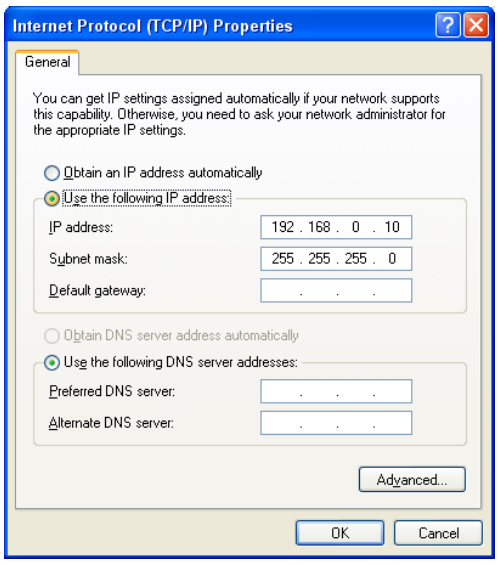


2. **a.** Double click **Network Connection**.
   b. Double click **Local Area Connection**.
   c. Click **Properties**.
   d. Confirm that **Internet Protocol (TCP/IP)** is listed.

   Note

   If **Internet Protocol (TCP/IP)** is not listed, you must install TCP/IP. For details about installation, refer to the documentation for Windows XP.

3. Open **Internet Protocol (TCP/IP) Properties** from the list.

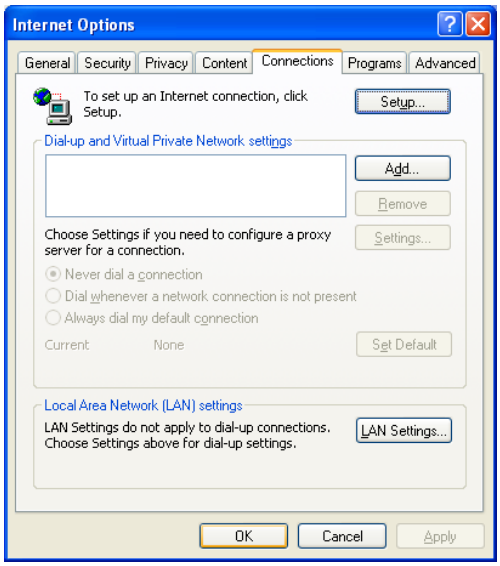

Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
192 . 168 . 0 . 10
Subnet mask:
255 . 255 . 255 . 0
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Advanced...
OK
Cancel

4. **a.** Select **Use the following IP address:**.
   b. In the **IP address** box, type **192.168.0.10**.
   This is an example entry. Type an IP address different from those assigned to the other LAN devices within the same network.
   c. In the **Subnet mask** box, type **255.255.255.0**.
   d. Click **OK**.

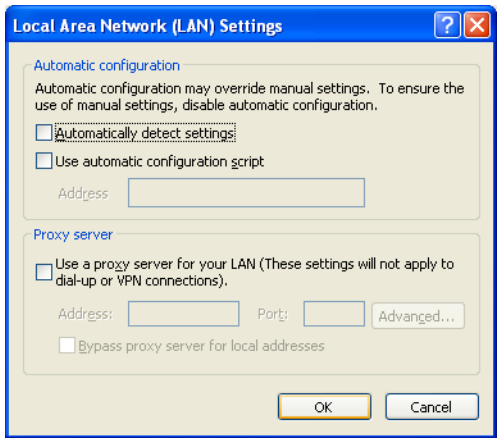
   Note

   To obtain an IP address automatically, select **Obtain an IP address automatically**.

5. **a.** Start Internet Explorer from the **Start** menu.
   b. Click **Internet Options** from the **Tools** menu.



6. **a.** Click the **Connections** tab.
   b. Select **Never dial a connection** if necessary.
   c. Click **LAN Settings**.

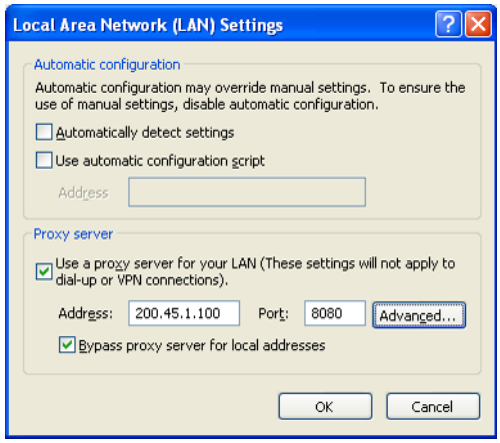

Local Area Network (LAN) Settings
Automatic configuration
Automatic configuration may override manual settings. To ensure the use of manual settings, disable automatic configuration.
Automatically detect settings
Use automatic configuration script
Address
Proxy server
Use a proxy server for your LAN (These settings will not apply to dial-up or VPN connections).
Address:
Port:
Advanced...
Bypass proxy server for local addresses
OK
Cancel

7. **a.** Clear all check boxes.
   b. Click **OK**.

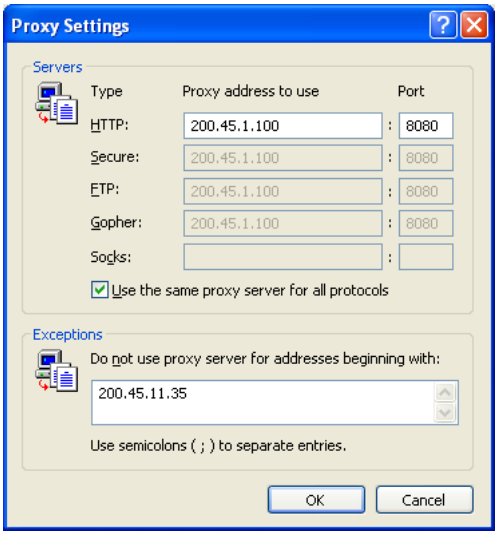
   Your PC is now ready for programming through direct access to the card.

Notice When Using a Proxy Server

If the network has a proxy server installed, you must apply the appropriate proxy settings to your PC. In this case, follow the steps below in substitution for step 5 above:



5. **a.** Check all boxes for **Proxy server**.
   b. Click **Advanced**.



6. **a.** Under **Do not use proxy server for addresses beginning with:**, type the IP address of the LAN port of the card.

   b. Click **OK**.

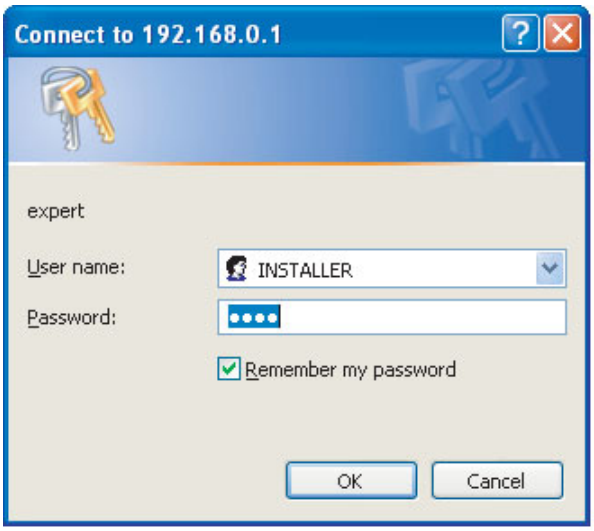
Your PC is now ready for programming the card through an IP network.

3.2.2 Starting the SIP-GW4 Maintenance Utility

To start the SIP-GW4 Maintenance Utility, log in from your PC connected to the card by specifying the default IP address, username, and password.

Notes

- If the SIP-GW4 Maintenance Utility is being operated during VoIP communication, it may degrade the speech quality. Programming of the card should be avoided during calls.
- The contents and design of the software are subject to change without notice.



1. Start Internet Explorer from the **Start** menu.
2. Specify the URL of the SIP-GW4 Maintenance Utility with the IP address **http://192.168.0.1:8000/Exp**.
3. **a.** The log-in screen is displayed. In the **User name** box, type **INSTALLER**.
   b. In the **Password** box, type **1234**.
   c. Click **OK**.

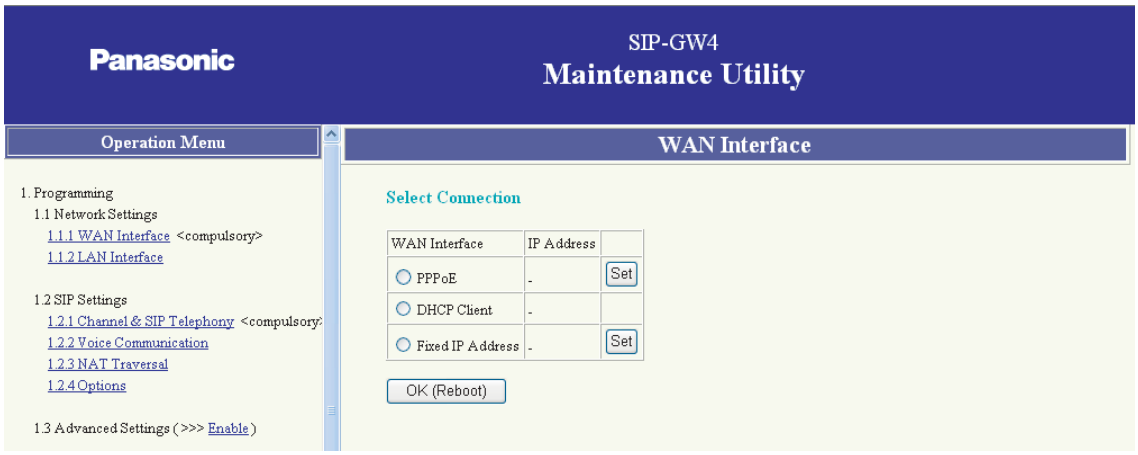
   Now the menu screen of the SIP-GW4 Maintenance Utility is displayed.

3.3 Programming—Network Settings

3.3.1 WAN Interface

Select Connection

1. Click **1.1.1 WAN Interface** in the operation menu.



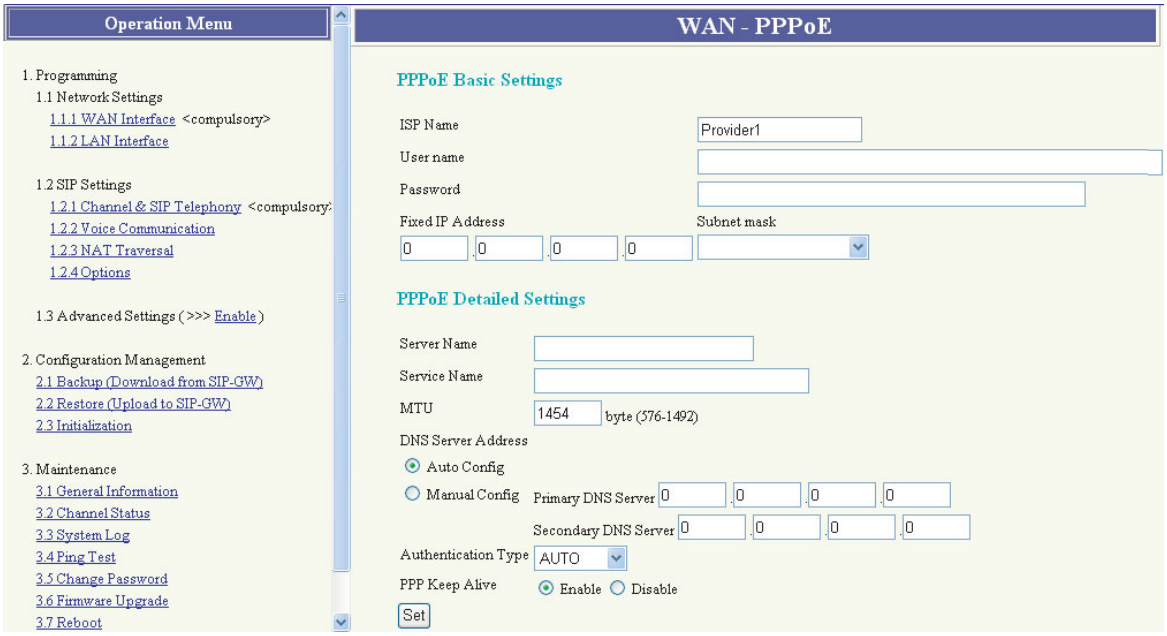
2. Specify a connection method for the WAN port from one of the following.

Parameter	Description
PPPoE	Select when connecting to the network using PPPoE connection (including using a fixed IP address for PPPoE connection).
DHCP Client	Select when connecting to the network using DHCP server.
Fixed IP Address	Select when connecting to the network using a fixed IP address assigned by an ISP.

3. Click **Set** for the selected method for detailed configuration.

PPPoE Configuration

If you select **PPPoE** in **Select Connection** and click the corresponding **Set** button, the following screen is displayed.



PPPoE Basic Configuration

1. Assign each parameter, based on the information provided by the ISP, referring to the descriptions below.

Parameter & Description	Default	Value Range
ISP name Specifies the ISP name (optional).	Provider1	Max. 15 alphanumeric characters
User name Specifies the user name provided by the ISP (compulsory).	No default	Max. 63 alphanumeric characters
Password Specifies the password provided by the ISP (compulsory).	No default	Max. 31 alphanumeric characters (case-sensitive)
Fixed IP Address*1 Specifies the IP address provided by the ISP (required only when using a fixed IP address for PPPoE connection).	0.0.0.0*2	Available IP addresses
Subnet mask Specifies the subnet mask address for the fixed IP address (required only when using a fixed IP address for PPPoE connection).	No default	28–32

*1: If not using a fixed IP address for PPPoE connection, do not change the default value.
*2: If obtaining an IP address automatically, do not change the default IP address.

PPPoE Detailed Configuration

Generally, the following configurations are not required.

1. If necessary, assign each parameter referring to the descriptions below.

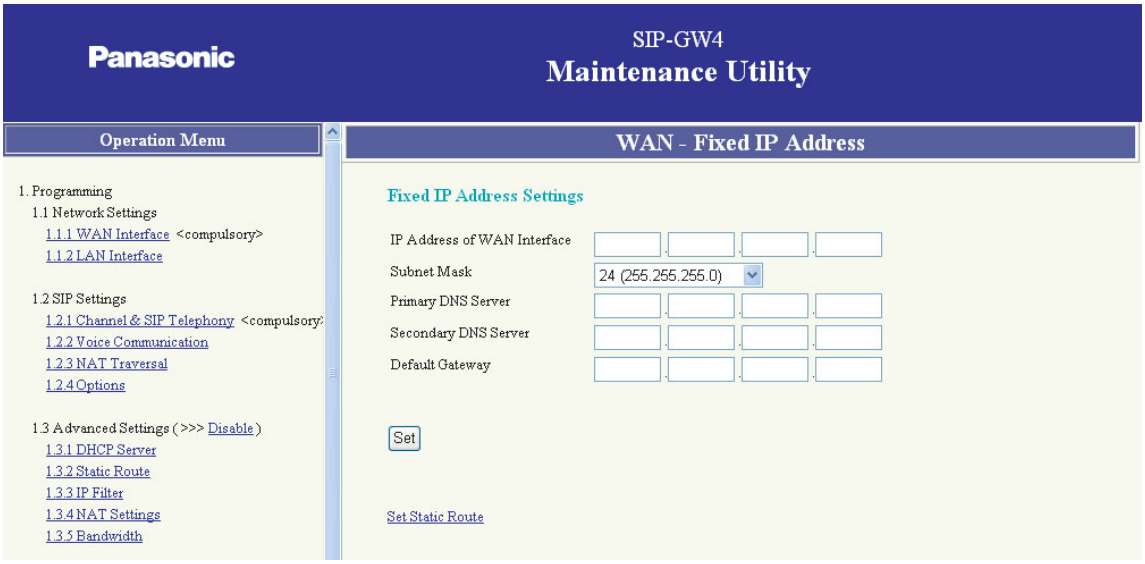
Parameter & Description	Default	Value Range
Server Name Specifies the server name used for PPPoE connection.	No default	Max. 23 alphanumeric characters
Service Name Specifies the service name that is applied to a PPPoE connection.	No default	Max. 31 alphanumeric characters
MTU Specifies the maximum size of IP packet to be sent.	1454	576–1492
DNS Server Address Specifies the method of IP address setting for a DNS server.	Auto Config	Auto Config, Manual Config*
Authentication Type Specifies the authentication method.	AUTO	AUTO, Not Used, CHAP, PAP
PPP Keep Alive Specifies whether the PPP Keep Alive feature is used or not.	Enable	Enable, Disable

*: When selecting "**Manual Config**", specify the IP addresses of both **Primary DNS Server** and **Secondary DNS Server**.

2. Click **Set**.
   The **Select Connection** screen is displayed.
3. Click **OK (Reboot)** to reboot the card.

Fixed IP Address Configuration

If you select **Fixed IP Address** in **Select Connection** and click the corresponding **Set** button, the following screen is displayed.



1. Assign each parameter, based on the information provided by the ISP, referring to the descriptions below.

Parameter & Description	Default	Value Range
IP Address of WAN Interface Specifies the IP address of the WAN port.	No default	Available IP addresses
Subnet Mask Specifies the subnet mask address of the WAN port.	24 (255.255.255.0)	8–30
Primary DNS Server Specifies the IP address of the primary DNS server.	No default	Available IP addresses
Secondary DNS Server Specifies the IP address of the secondary DNS server.	No default	Available IP addresses
Default Gateway Specifies the default gateway IP address.	No default	Available IP addresses

Note

Do not assign an IP address and a subnet mask address from the same network as the LAN port, for example:
LAN port: IP address 192.168.0.1, Subnet mask 24 (255.255.255.0)
WAN port: IP address 192.168.0.2, Subnet mask 24 (255.255.255.0)

If you do so, disconnect the cables from the LAN and WAN ports and reboot the SIP-GW4 card. Then, connect the cable only to the LAN port, and reassign the IP address and subnet mask address for the WAN port.

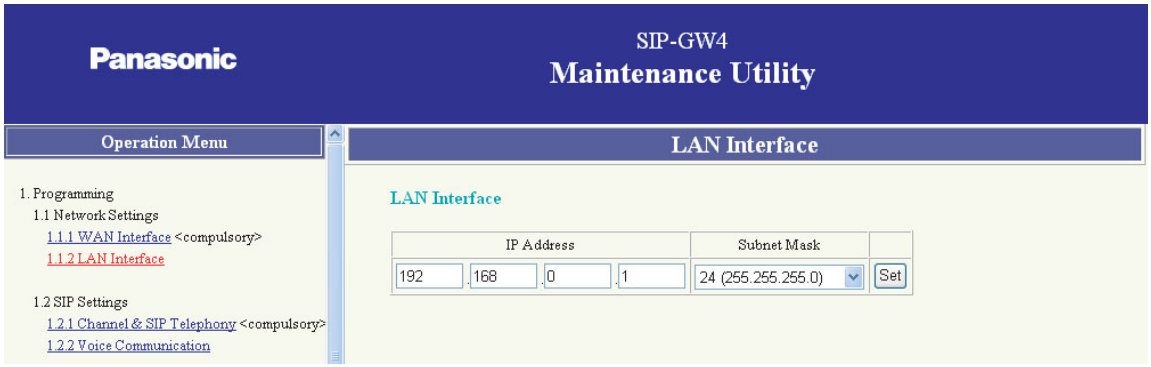
2. Click **Set**.
3. Click **Set Static Route** to specify a static route.

Note

Set Static Route is displayed only when **1.3 Advanced Settings** is enabled. Refer to "3.5 Programming—Advanced Settings".

3.3.2 LAN Interface

1. Click **1.1.2 LAN Interface** in the operation menu.



2. Assign each parameter referring to the descriptions below.

Parameter & Description	Default	Value Range
IP Address Specifies the IP address of the card.	192.168.0.1	Available IP addresses for the card
Subnet Mask Specifies the subnet mask address of the card.	24 (255.255.255.0)	8–30

Notes

- Do not assign an IP address and a subnet mask address from the same network as the WAN port, for example:
  LAN port: IP address 192.168.0.1, Subnet mask 24 (255.255.255.0)
  WAN port: IP address 192.168.0.2, Subnet mask 24 (255.255.255.0)

  If you do so, disconnect the cables from the LAN and WAN ports and reboot the SIP-GW4 card. Then, connect the cable only to the LAN port, and reassign the IP address and subnet mask address for the LAN port.
- If you change the IP address or subnet mask address of the card here, the settings of **IP Masquerade (NAPT)** in **3.5.4 NAT Settings** may need to be changed as well. Refer to "3.5.4 NAT Settings".

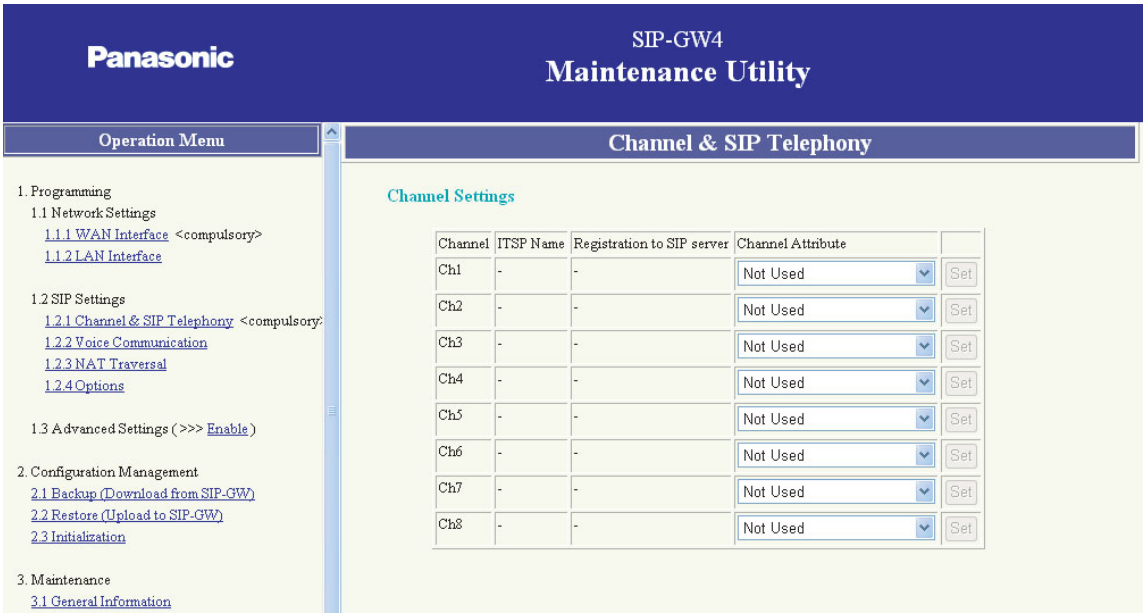
3. Click **Set**.
   A confirmation screen is displayed.

3.4 Programming—SIP Settings

3.4.1 Channel & SIP Telephony

Channel Settings

1. Click **1.2.1 Channel & SIP Telephony**.



[Items in the table]

Item	Explanation
Channel	Indicates the channel number.
ITSP Name	Indicates the ITSP (Internet Telephony Service Provider) name specified in **Server Settings** in **SIP Telephony Basic Settings**.
Registration to SIP server	Indicates the registration status of each channel to the SIP server, as follows: • –: The channel is not assigned. • **Reboot to enable new setting**: Reboot is required.* • **Succeeded**: Registration to the SIP server is complete, and calls can be made/received. • **Failed**: Registration to the SIP server is incomplete.
Channel Attribute	Indicates the attribute of each channel. It is necessary to program this item to activate each channel.

*: When changing the attribute between "**Basic channel**" and "**Additional channel of ChN**", reboot is not required.

2. Specify **Channel Attribute** for each channel referring to the descriptions below.

Attribute	Description
Not Used (default)	The channel is not in use.
Basic channel	A subscriber channel. If you select this attribute, the "**Set**" button will become active, which allows you to configure **SIP Telephony Basic Settings** and **SIP Telephony Detailed Settings**.
Additional channel of ChN (N: 1–8)	Subordinative channel that can be added to **Basic channel** above. This setting is to be configured when several channels can be used for one subscription with an ITSP. Selects a basic channel number to which an additional channel is added.

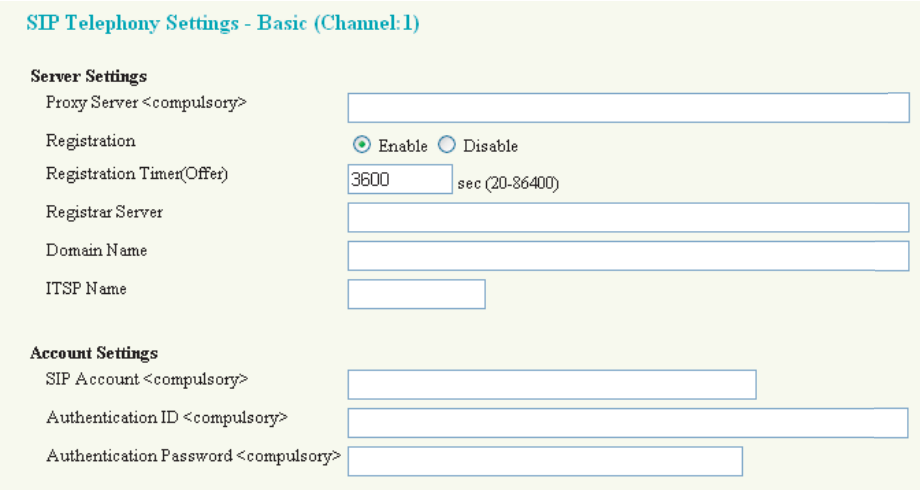
Note

Channels 5 through 8 are only available when the SIP-DSP4 card is mounted on the SIP-GW4 card.

3. Click the **Reboot** button that appears below the table after all the required configuration, including the following SIP Telephony Basic Settings, is complete.

SIP Telephony Basic Settings

If you change the **Channel Attribute** to **Basic channel** in **Channel Settings** and click the corresponding **Set** button, the following screen is displayed.



1. Assign parameters in **Server Settings** based on the information provided by the ITSP.

Parameter & Description	Default	Value Range
Proxy Server Specifies the domain name or IP address of a proxy server (compulsory). If an ITSP provides both Proxy and Registrar Server information, specify the Proxy Server information.	No default	Available domain names or IP addresses (max. 83 alphanumeric characters)*1
Registration Specifies whether to register on the SIP server or not (if required).	Enable*2	Enable, Disable

Parameter & Description	Default	Value Range
Registration Timer (Offer) Specifies the length of time that the card offers for registration to the SIP server (if required).*3	3600 sec*2	20–86400 sec
Registrar Server Specifies the domain name or IP address of a registrar server (if provided). If an ITSP provides both Proxy and Registrar Server information, specify the Registrar Server information.	No default*2	Available domain names or IP addresses (max. 83 alphanumeric characters)*1
Domain Name Specifies the domain name (if provided besides proxy and registrar server).	No default*2	Max. 83 alphanumeric characters
ITSP Name Specifies the ITSP name (optional).	No default	Max. 8 alphanumeric characters

*1: If the port number of the server is not "5060", enter ":" and the specified port number after the domain name or IP address.

[Example]

- If you do not need to specify the port number of the server (i.e., the port number is 5060):
  Domain name format: example.com
  IP address format: 192.168.1.1
- If you need to specify the port number of the server:
  Domain name format: example.com**:7777**
  IP address format: 192.168.1.1**:7777**

The value range of the port number is 1024–65535.

*2: No need to change unless necessary.

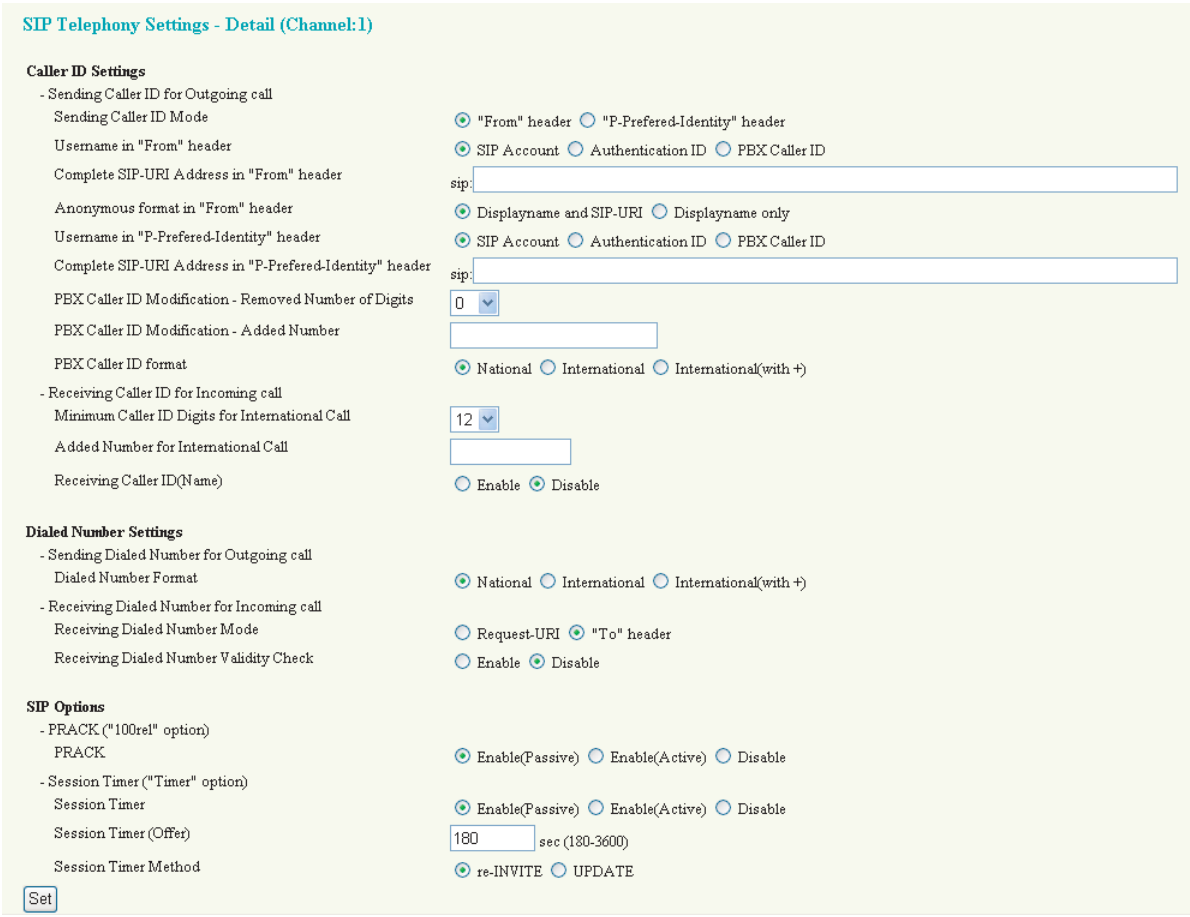
*3: The actual length of time depends on the negotiation with the SIP server or the other device. Therefore, the Registration Timer will not always function for the length of time set in advance.

2. Assign parameters in **Account Settings** based on the information provided by the ITSP.

Parameter & Description	Default	Value Range
SIP Account Specifies the SIP account (telephone number) (compulsory).	No default	Max. 63 alphanumeric characters
Authentication ID Specifies the ID (compulsory).	No default	Max. 63 alphanumeric characters
Authentication Password Specifies the password (compulsory).	No default	Max. 32 alphanumeric characters

SIP Telephony Detailed Settings

If you change the **Channel Attribute** to **Basic channel** in **Channel Settings** and click the corresponding **Set** button, the following screen is displayed.



The following settings may be required depending on the ITSP being used.

1. Assign parameters in **Caller ID Settings** referring to the descriptions below.

[Sending Caller ID for Outgoing call]
Configurations for caller ID to be sent when making calls.

Parameter & Description	Default	Value Range
Sending Caller ID Mode Specifies the header of the SIP message in which the caller ID is stored.	"From" header	"From" header, "P-Prefered-Identity" header
Username[*1] in "From" header Specifies the value to be stored in the username part of the SIP-URI of the "From" header.	SIP Account	SIP Account, Authentication ID, PBX Caller ID[*2]

Parameter & Description	Default	Value Range
Complete SIP-URI Address in "From" header Specifies the complete SIP-URI address of the "From" header. **Note** If you enter the complete SIP-URI address here, the configuration in **Username in "From" header** will be invalid.	No default	Max. 89 alphanumeric characters
Anonymous format in "From" header Specifies the format of the "From" header when not sending caller ID.	Displayname and SIP-URI	Displayname and SIP-URI, Displayname only*3
Username in "P-Prefered-Identity" header Specifies the value to be stored in the username part of the SIP-URI of the "P-Prefered-Identity" header (required only when this header is selected in **Sending Caller ID Mode**).	SIP Account	SIP Account, Authentication ID, PBX Caller ID*2
Complete SIP-URI Address in "P-Prefered-Identity" header Specifies the complete SIP-URI address of the "P-Prefered-Identity" header (required only when this header is selected in **Sending Caller ID Mode**). **Note** If you enter the complete SIP-URI address here, the configuration in **Username in "P-Prefered-Identity" header** will be invalid.	No default	Max. 89 alphanumeric characters
PBX Caller ID Modification–Removed Number of Digits Specifies the number of leading digits of the caller ID to be removed (required only when "**PBX Caller ID**" is selected above).	0	0–32
PBX Caller ID Modification–Added Number Specifies the number to be added to the caller ID in the place of the removed digits above (required only when "**PBX Caller ID**" is selected above).	No default	Max. 20 alphanumeric characters
PBX Caller ID Format Selects the format of the caller ID (required only when "**PBX Caller ID**" is selected above).	National	National, International, International (with +)*4

*1: For example, in the SIP-URI "sip:1234@example.com", the username is "1234".
*2: If "**PBX Caller ID**" is selected, it is necessary to programme the PBX so that it will send the Caller ID to the SIP-GW4 card. Refer to "**4.1 Programming the PBX**".

*3: If "**Displayname and SIP-URI**" is selected, the displayname part and the SIP-URI of the "From" header will be displayed as "**Anonymous**".
[Example]
From: **Anonymous** <sip:**anonymous@anonymous.invalid**>

If "**Displayname only**" is selected, only the displayname part of the "From" header will be displayed as "**Anonymous**".
[Example]
From: **Anonymous** <sip:1234@example.com>

*4: The Caller ID Format for each value is as follows:
National: <Area Code> <Number>
International: <Country Code> <Area Code> <Number>
International (with +): + <Country Code> <Area Code> <Number>

[Receiving Caller ID for Incoming call]
Configurations for caller ID to be received from callers.

Parameter & Description	Default	Value Range
Minimum Caller ID Digits for International Call Specifies the minimum number of digits of the caller ID for international calls.	12	1–31
Added Number for International Call Specifies the number to be added to the caller ID for international calls.	No default	Max. 8 alphanumeric characters
Receiving Caller ID (Name) Specifies whether to receive caller ID (name) from a caller.	Disable	Enable, Disable

2. Assign parameters in **Dialed Number Settings** referring to the descriptions below.

[Sending Dialed Number for Outgoing call]

Parameter & Description	Default	Value Range
Dialed Number Format Specifies the format of the dialled number to be sent to the called party.	National	National, International, International (with +)*

*: The Dialed Number Format for each value is as follows:
National: <Area Code> <Number>
International: <Country Code> <Area Code> <Number>
International (with +): + <Country Code> <Area Code> <Number>

[Receiving Dialed Number for Incoming call]

Parameter & Description	Default	Value Range
Receiving Dialed Number Mode Specifies the header of the SIP message in which the dialled number is stored when receiving a call.	"To" header	Request-URI, "To" header

Parameter & Description	Default	Value Range
Receiving Dialed Number Validity Check Specifies whether to check the validity of a dialled number when receiving a call.	Disable*	Enable, Disable

*: Depending on the ITSP conditions, you may be required to change the setting to "Enable".

3. Assign parameters in **SIP Options** referring to the descriptions below.

Parameter & Description	Default	Value Range
PRACK Specifies whether the PRACK feature is enabled or disabled.	Enable (Passive)	Disable Enable (Passive): Activates this feature only when requested by the other device Enable (Active): Activates this feature only if the other device supports the feature
Session Timer Specifies whether Session Timer is enabled or disabled.	Enable (Passive)	Disable Enable (Passive): Activates this feature only when requested by the other device Enable (Active): Activates this feature only if the other device supports the feature
Session Timer (Offer) Specifies the length of time that the card offers for Session Timer.*	180 sec	180–3600 sec
Session Timer Method Specifies the method to be used for Session Timer.	re-INVITE	re-INVITE, UPDATE

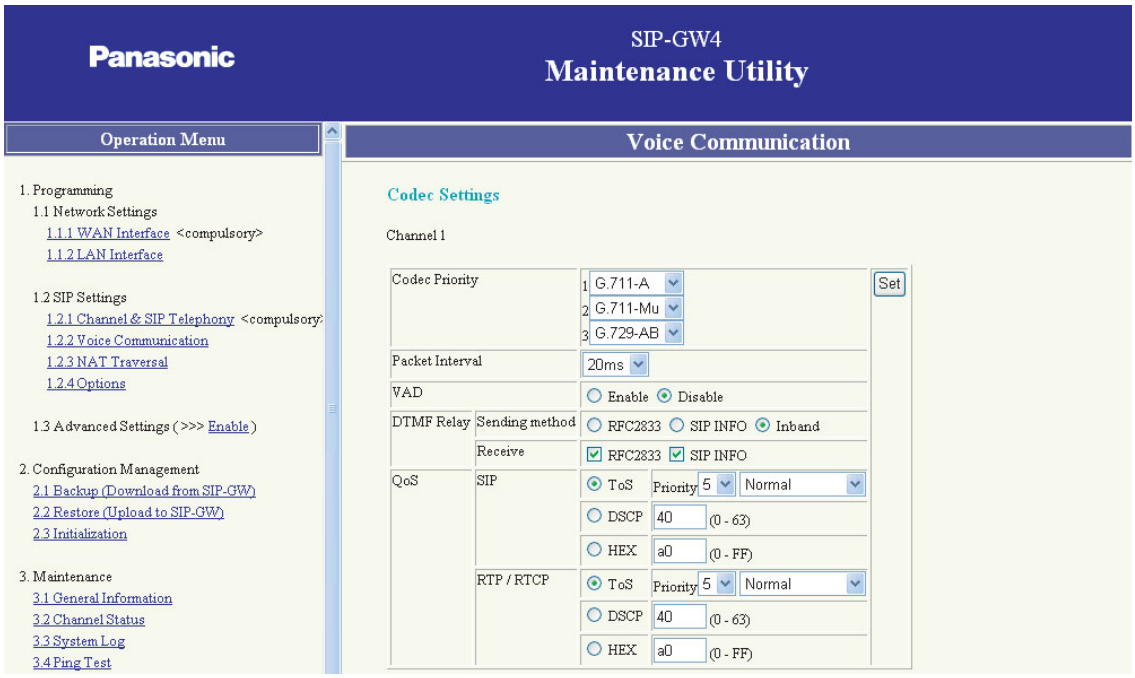
*: The actual length of time depends on the negotiation with the SIP server or the other device. Therefore, the Session Timer will not always function for the length of time set in advance.

4. Click **Set**.
The **Channel Settings** screen is displayed.

3.4.2 Voice Communication

The following is the procedure to set the voice encoding rules.

1. Click **1.2.2 Voice Communication**.



2. Assign each parameter for each channel, referring to the descriptions below.

Parameter & Description	Default	Value Range
Codec Priority Specifies the priority of the codecs to be used. The order of priority is as follows: 1 (High), 3 (Low)	**1.** G.711-A **2.** G.711-Mu **3.** G.729-AB	G.711-Mu, G.711-A, G.729-AB, None (for priority 2 and 3 only)
Packet Interval Specifies the interval time until the next RTP packet is sent.	20 ms	20, 30, 40, 50, 60 ms
VAD Specifies whether to use Voice Activity Detection (VAD). The VAD conserves bandwidth by detecting silent periods during a call and suppressing the packets of silence from being sent to the network.	Disable	Enable, Disable

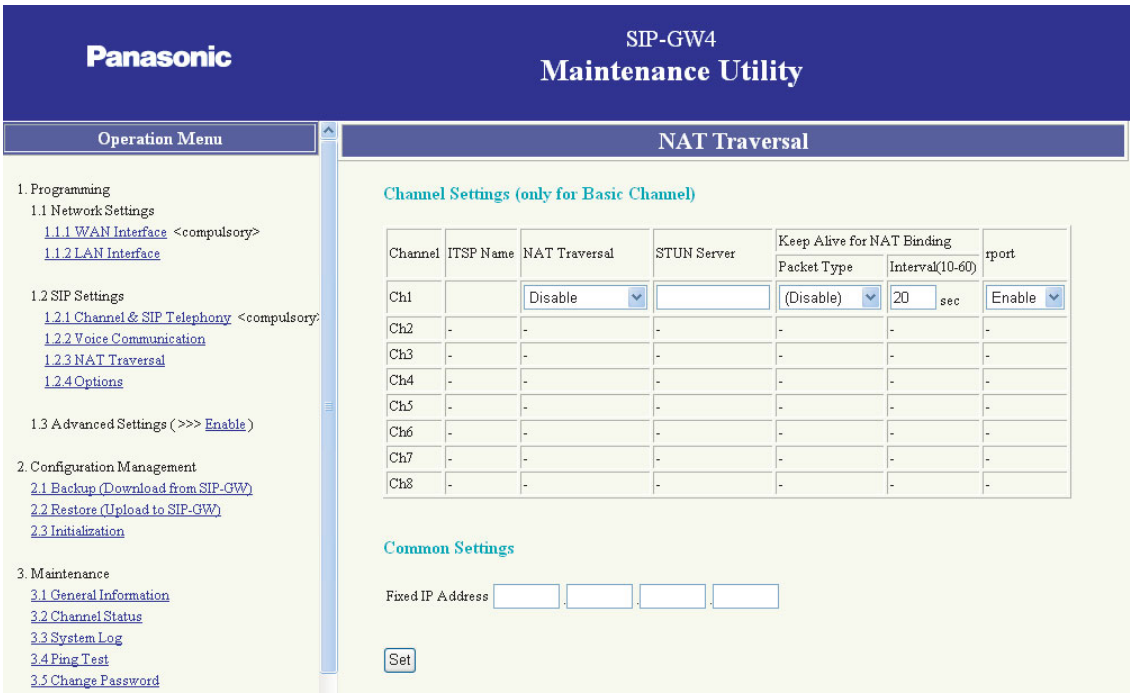
Parameter & Description			Default	Value Range
DTMF Relay		**Sending method** Specifies the sending method of DTMF tones. This enables end-to-end DTMF relay over the network.	Inband	RFC2833, SIP INFO, Inband
		Receive Specifies whether to receive DTMF tones in the RFC2833 and/or SIP INFO methods.	RFC2833, SIP INFO (Both methods are enabled.)	RFC2833, SIP INFO
QoS	**SIP**	**ToS** Specifies the value in the ToS field of the header of IP packets by a generic term.	Priority: 5	0–7
			Normal	Normal, Monetary Cost, Reliability, Throughput, Delay
		DSCP Specifies the value in the ToS field of the header of IP packets by a DSCP for DiffServ.	40	0–63
		HEX Specifies the value in the ToS field of the header of IP packets by a hexadecimal number.	a0	0–FF
	RTP/ RTCP	**ToS** Specifies the value in the ToS field of the header of IP packets by a generic term.	Priority: 5	0–7
			Normal	Normal, Monetary Cost, Reliability, Throughput, Delay
		DSCP Specifies the value in the ToS field of the header of IP packets by a DSCP for DiffServ.	40	0–63
		HEX Specifies the value in the ToS field of the header of IP packets by a hexadecimal number.	a0	0–FF

4. Click **Set**.
5. The new setting must be followed by a reboot to become effective.
   Do one of the following:
   – Click **Reboot Now** to make the changes effective now.
   – Click **Reboot Later** to return to the previous screen.

3.4.3 NAT Traversal

Channel Settings (only for Basic Channel)

1. Click **1.2.3 NAT Traversal** in the operation menu.



2. Assign each parameter for each channel, referring to the descriptions below.

Parameter & Description	Default	Value Range
Channel Indicates the channel number specified in **Basic Channel** in **1.2.1 Channel & SIP Telephony**.	No default	Channel number
ITSP Name Indicates the ITSP (Internet Telephony Service Provider) name specified in **Server Settings** in **SIP Telephony Basic Settings** in **1.2.1 Channel & SIP Telephony**.	No default	ITSP name
NAT Traversal Specifies the NAT traversal method.	Disable	Disable: NAT traversal is disabled. Fixed IP Addr.: The global IP address of the router with NAT enabled is fixed. STUN: A STUN Server, used alongside the SIP Server, finds out the global IP address of the router with NAT enabled.

Parameter & Description		Default	Value Range
STUN Server[*1] Specifies the domain name or IP address of the STUN server. This setting is compulsory if **STUN** is selected in **NAT Traversal**.		No default	Domain name (max. 83 alphanumeric characters) or IP address[*2]
Keep Alive for NAT Binding	**Packet Type** Specifies the type of Keep Alive packets to be sent out.	(Disable)	(Disable), Blank UDP
	Interval (10–60) Specifies the interval time until the next Keep Alive packet is sent. **Note** It is required to set this interval shorter than the NAT binding time of the router. The default value is appropriate in most cases.	20 sec	10–60 sec
rport Enables this feature to request that the SIP server sends the response back to the source IP address and port from which the request originated.		Enable	Enable, Disable

*1: When more than one channel is assigned for only one ITSP, specify **STUN Server** and **Keep Alive for NAT Binding** for only one channel. The settings are automatically applied to the other channels.

*2: If the port number of the server is not "3478", enter ":" and the specified port number after the domain name or IP address.

[Example]

- If you do not need to specify the port number of the server (i.e., the port number is 3478):
  Domain name format: example.com
  IP address format: 192.168.1.1
- If you need to specify the port number of the server:
  Domain name format: example.com:**7777**
  IP address format: 192.168.1.1:**7777**
  The value range of the port number is 1024–65535.

Common Settings

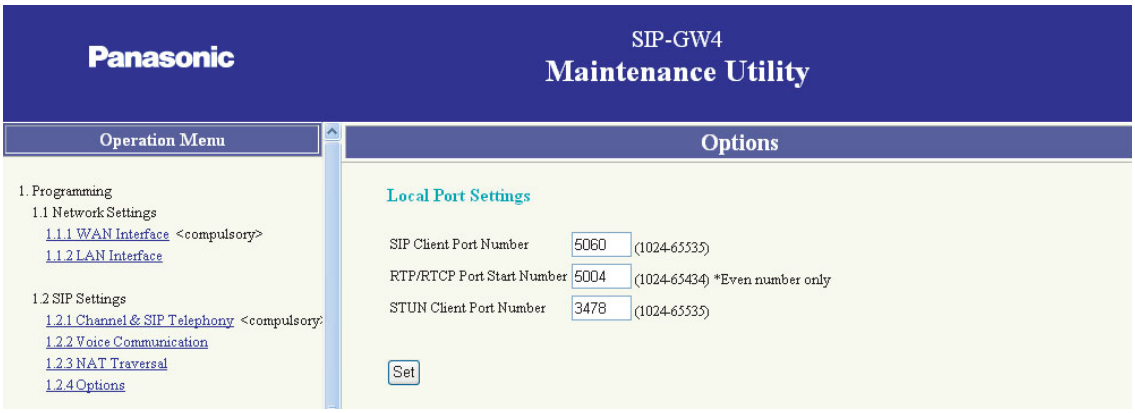
1. Assign the parameter, based on the information provided by the ISP, referring to the description below.

Parameter & Description	Default	Value Range
Fixed IP Address Specifies the global IP address of the router with NAT enabled. This setting is compulsory if **Fixed IP Addr.** is selected in **NAT Traversal**.	No default	Available IP addresses

3.4.4 Options

Local Port Settings

1. Click **1.2.4 Options** in the operation menu.



2. Assign each parameter referring to the descriptions below.

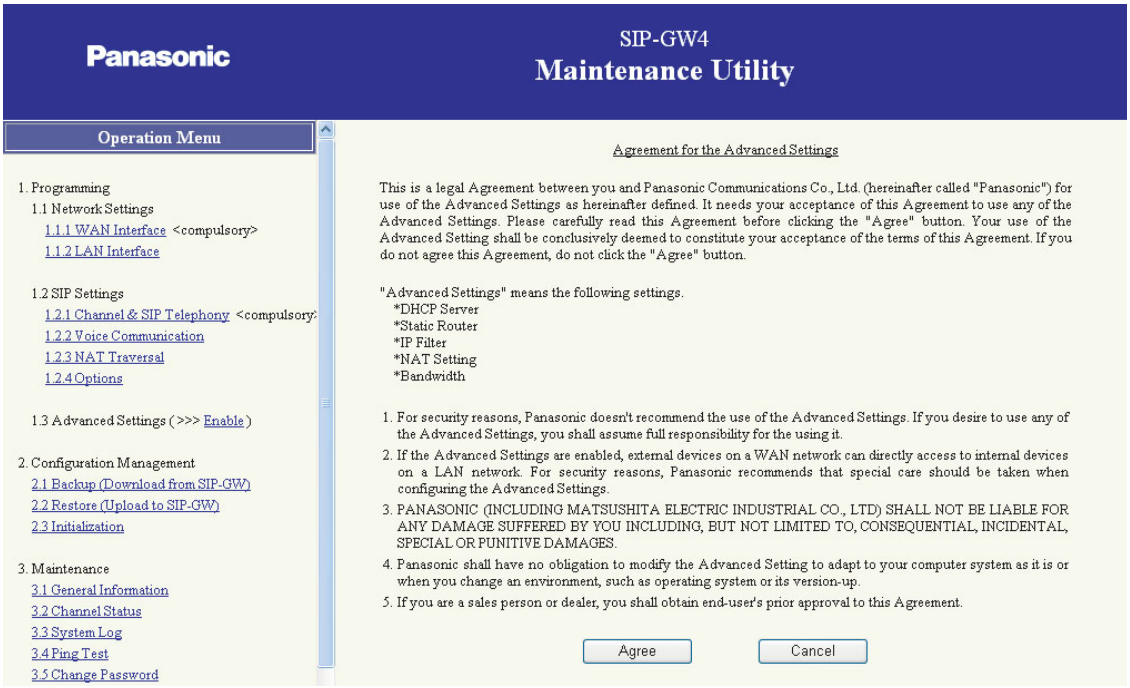
Parameter & Description	Default	Value Range
SIP Client Port Number[*1] Specifies the port number of the SIP-GW4 card used for communications with the SIP server.	5060	1024–65535
RTP/RTCP Port Start Number Specifies the starting port number of the dynamic ports used for voice communications. Starting with this port, 100 consecutive ports can be used as RTP/RTCP ports.[*2]	5004	1024–65434 (even number only)
STUN Client Port Number[*1] Specifies the port number of the SIP-GW4 card used for communications with the STUN server.	3478	1024–65535

*1: Specify different values for each parameter.
*2: For example, if the RTP/RTCP Port Start Number is "5004" (default), ports 5004 to 5103 can be used as RTP/RTCP ports.

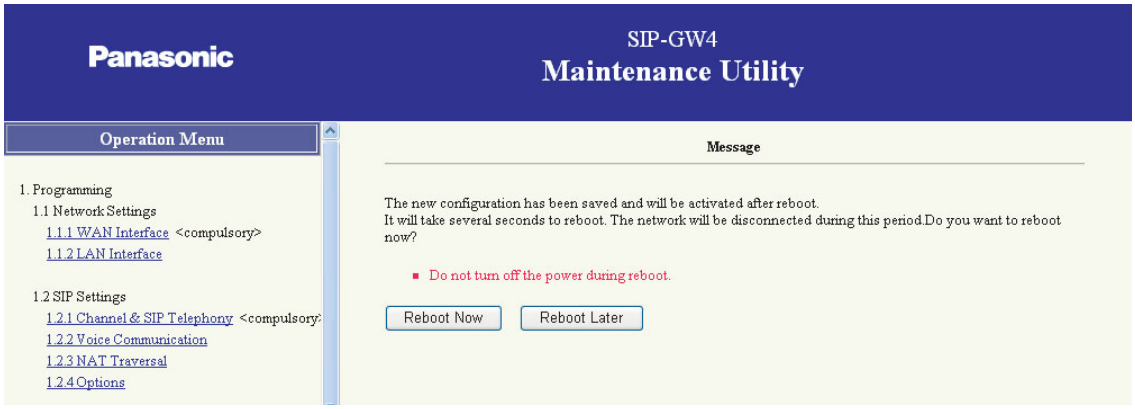
3.5 Programming—Advanced Settings

Enabling the Advanced Settings

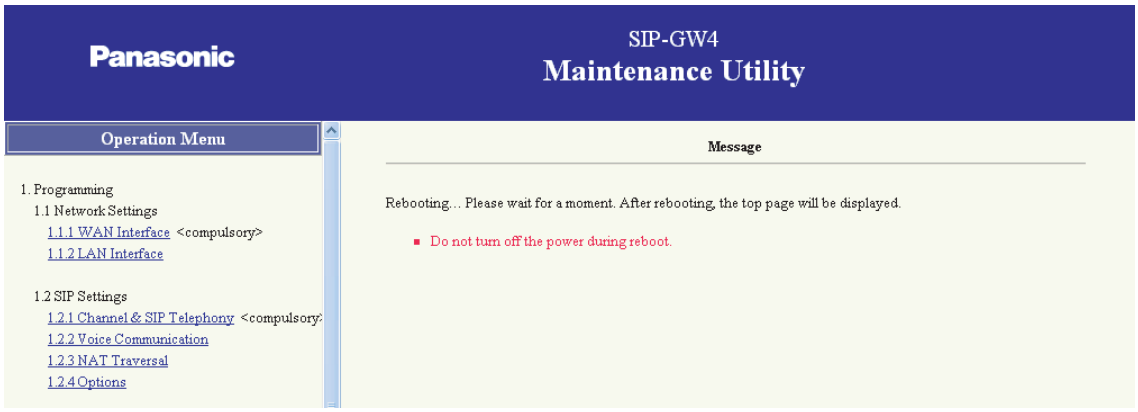
1. Click **Enable** for **1.3 Advanced Settings** in the operation menu.


Panasonic
SIP-GW4
Maintenance Utility
Operation Menu
1. Programming
1.1 Network Settings
1.1.1 WAN Interface <compulsory>
1.1.2 LAN Interface
1.2 SIP Settings
1.2.1 Channel & SIP Telephony <compulsory>
1.2.2 Voice Communication
1.2.3 NAT Traversal
1.2.4 Options
1.3 Advanced Settings (>>> Enable)
2. Configuration Management
2.1 Backup (Download from SIP-GW)
2.2 Restore (Upload to SIP-GW)
2.3 Initialization
3. Maintenance
3.1 General Information
3.2 Channel Status
3.3 System Log
3.4 Ping Test
3.5 Change Password
Agreement for the Advanced Settings
This is a legal Agreement between you and Panasonic Communications Co., Ltd. (hereinafter called "Panasonic") for use of the Advanced Settings as hereinafter defined. It needs your acceptance of this Agreement to use any of the Advanced Settings. Please carefully read this Agreement before clicking the "Agree" button. Your use of the Advanced Setting shall be conclusively deemed to constitute your acceptance of the terms of this Agreement. If you do not agree this Agreement, do not click the "Agree" button.
"Advanced Settings" means the following settings.
*DHCP Server
*Static Router
*IP Filter
*NAT Setting
*Bandwidth
1. For security reasons, Panasonic doesn't recommend the use of the Advanced Settings. If you desire to use any of the Advanced Settings, you shall assume full responsibility for the using it.
2. If the Advanced Settings are enabled, external devices on a WAN network can directly access to internal devices on a LAN network. For security reasons, Panasonic recommends that special care should be taken when configuring the Advanced Settings.
3. PANASONIC (INCLUDING MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD) SHALL NOT BE LIABLE FOR ANY DAMAGE SUFFERED BY YOU INCLUDING, BUT NOT LIMITED TO, CONSEQUENTIAL, INCIDENTAL, SPECIAL OR PUNITIVE DAMAGES.
4. Panasonic shall have no obligation to modify the Advanced Setting to adapt to your computer system as it is or when you change an environment, such as operating system or its version-up.
5. If you are a sales person or dealer, you shall obtain end-user's prior approval to this Agreement.
Agree
Cancel

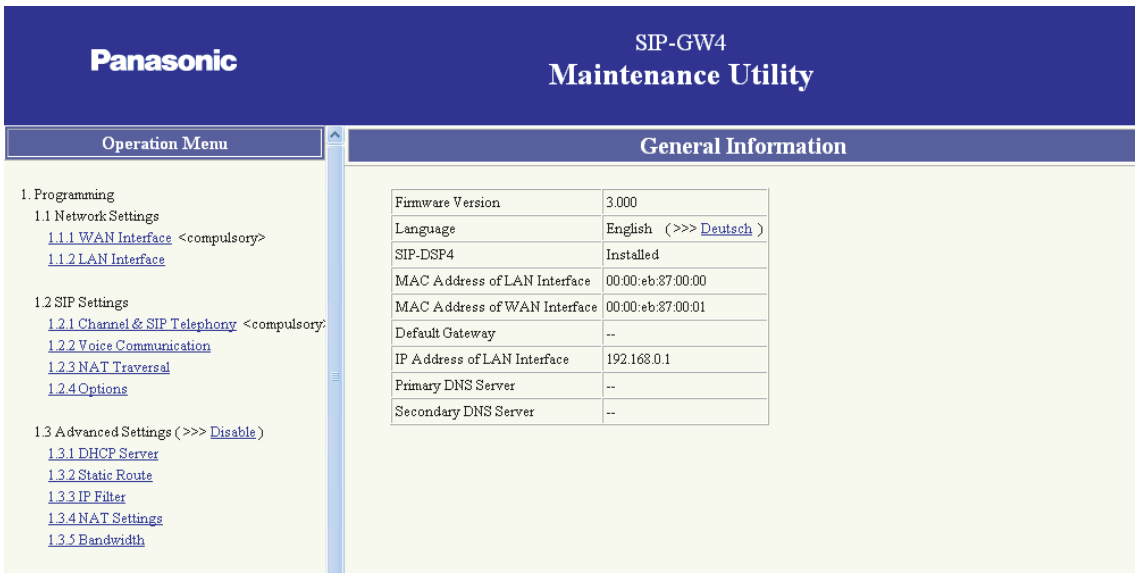
2. Read **Agreement for the Advanced Settings** carefully, and click **Agree**.


Panasonic
SIP-GW4
Maintenance Utility
Operation Menu
1. Programming
1.1 Network Settings
1.1.1 WAN Interface <compulsory>
1.1.2 LAN Interface
1.2 SIP Settings
1.2.1 Channel & SIP Telephony <compulsory>
1.2.2 Voice Communication
1.2.3 NAT Traversal
1.2.4 Options
Message
The new configuration has been saved and will be activated after reboot.
It will take several seconds to reboot. The network will be disconnected during this period.Do you want to reboot now?
Do not turn off the power during reboot.
Reboot Now
Reboot Later

3. Click **Reboot Now**.

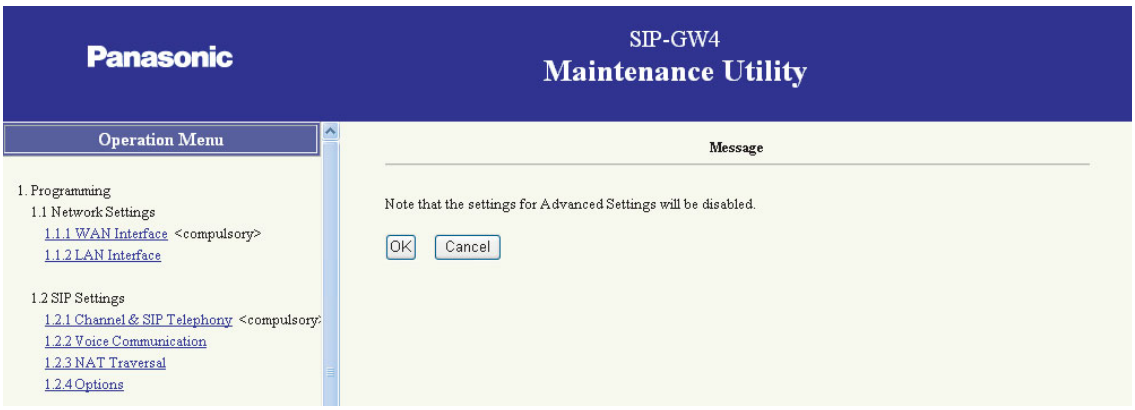


When the reboot finishes, the following screen is displayed, and each programming item is enabled.

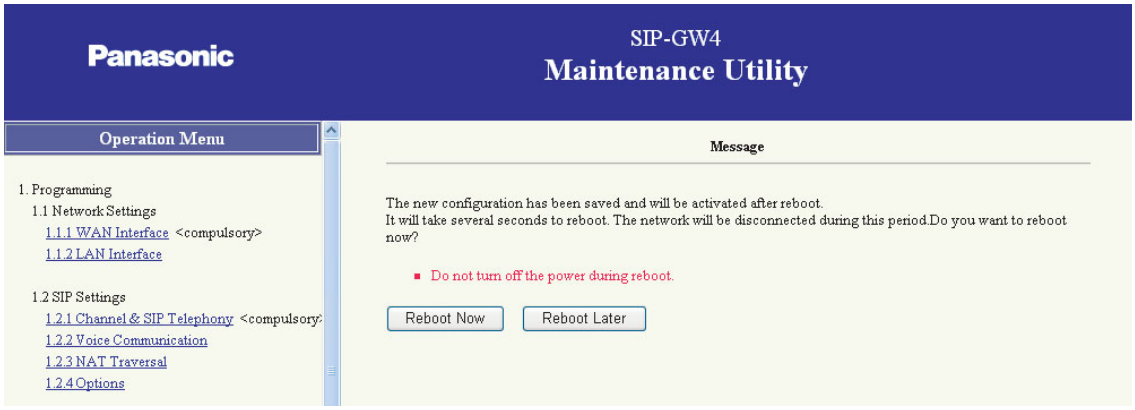


Disabling the Advanced Settings

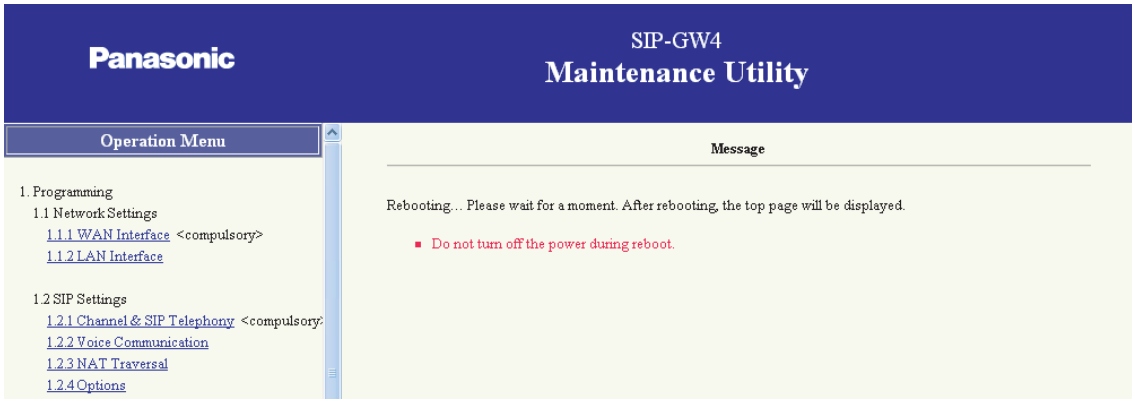
1. Click **Disable** for **1.3 Advanced Settings** in the operation menu



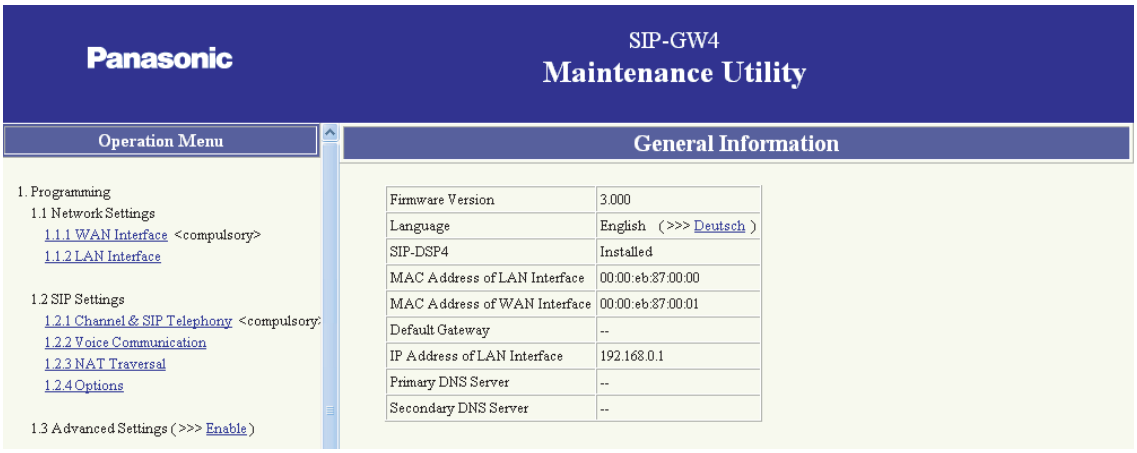
2. Click **OK**.


Panasonic
SIP-GW4
Maintenance Utility
Operation Menu
1. Programming
1.1 Network Settings
1.1.1 WAN Interface <compulsory>
1.1.2 LAN Interface
1.2 SIP Settings
1.2.1 Channel & SIP Telephony <compulsory>
1.2.2 Voice Communication
1.2.3 NAT Traversal
1.2.4 Options
Message
The new configuration has been saved and will be activated after reboot.
It will take several seconds to reboot. The network will be disconnected during this period.Do you want to reboot now?
Do not turn off the power during reboot.
Reboot Now
Reboot Later

3. Click **Reboot Now**.

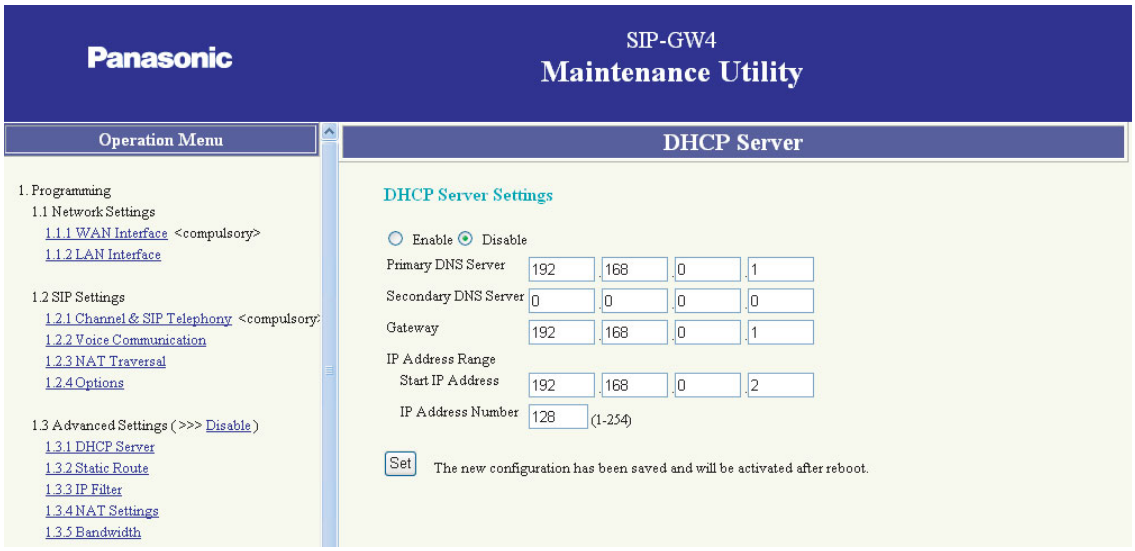


When the reboot finishes, the following screen is displayed, and each programming item is disabled.



3.5.1 DHCP Server

1. Click **1.3.1 DHCP Server** in the operation menu.



2. Assign each parameter referring to the descriptions below.

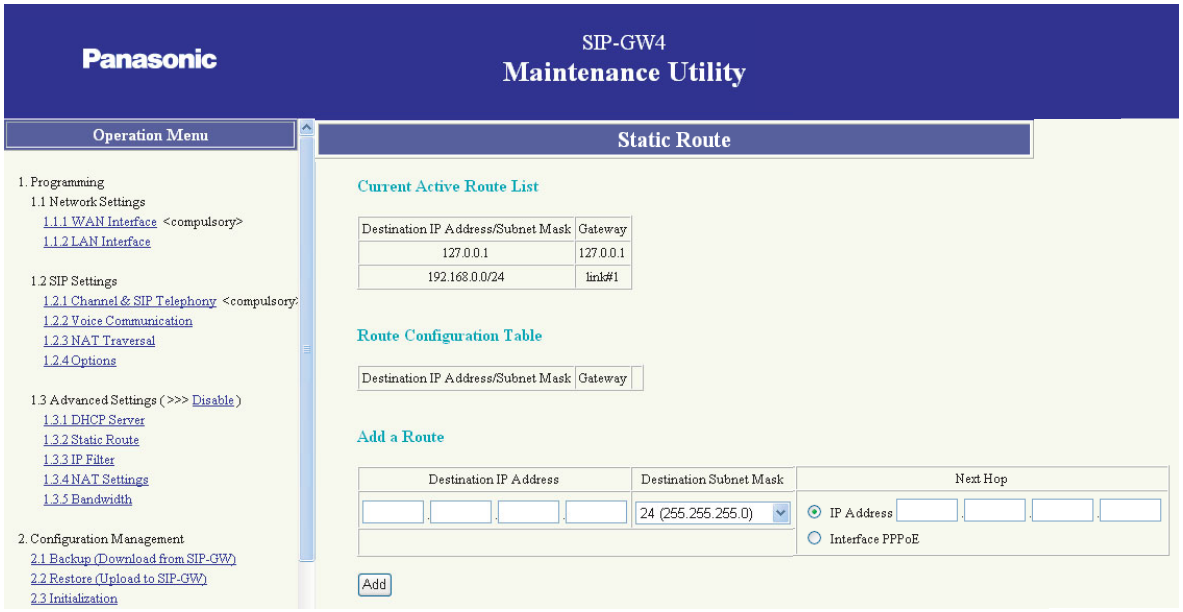
Parameter & Description	Default	Value Range
Enable/Disable Specifies the use of a DHCP server.	Disable	Enable, Disable
Primary DNS Server Specifies the IP address of the primary DNS server.	192.168.0.1	Available IP addresses for the primary DNS server
Secondary DNS Server Specifies the IP address of the secondary DNS server.	0.0.0.0	Available IP addresses for the secondary DNS server
Gateway Specifies the default gateway IP address of the card.	192.168.0.1	Available default gateway IP addresses for the card
Start IP Address Specifies the first IP address that the DHCP server can assign.	192.168.0.2	Available IP addresses
IP Address Number Specifies the number of IP addresses that the DHCP server can assign.	128	1–254

3. Click **Set**.
   A confirmation screen is displayed.
4. The new settings must be followed by a reboot to become effective.
   Do one of the following:
   – Click **Reboot Now** to make the changes effective now.

– Click **Reboot Later** to return to the previous screen.

3.5.2 Static Route

1. Click **1.3.2 Static Route** in the operation menu.



- **Current Active Route List**: Current active routing lists are displayed. "**link#1**" indicates the LAN port of the card, and "**link#2**" indicates the WAN port of the card.
- **Route Configuration Table**: Available routing lists are displayed. If there is a route displayed in the table, clicking the **Delete** button will delete the route from both **Current Active Route List** and **Route Configuration Table**.
- **Add a Route**: Additional routes can be specified.

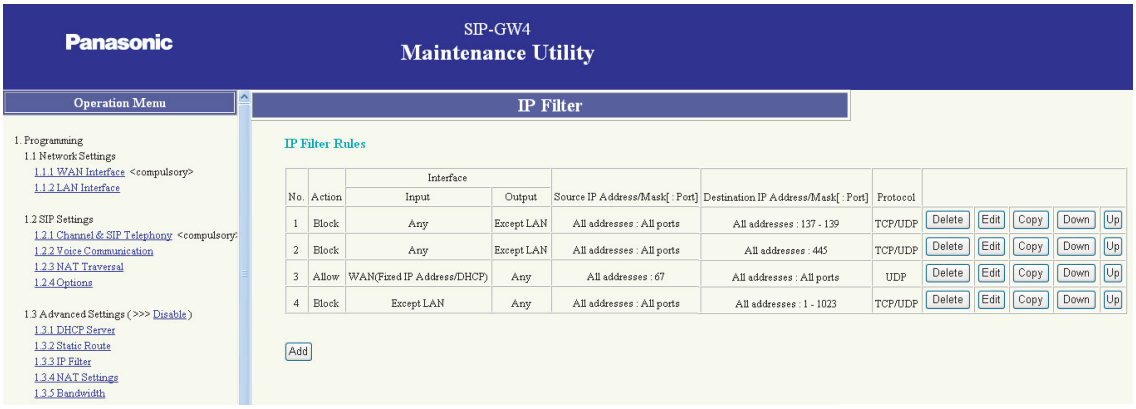
2. Assign each parameter referring to the descriptions below.

Parameter & Description	Default	Value Range
Destination IP Address Specifies the destination IP address.	No default	Available IP addresses (default route: 0.0.0.0)
Destination Subnet Mask Specifies the destination subnet mask address.	24 (255.255.255.0)	0, 8–32
Next Hop Specifies a gateway by selecting either an IP address or Interface.	No default	Available IP addresses, PPPoE

3. Click **Add**.
   A confirmation screen is displayed.
   The new route specified in **Add a Route** is added to **Route Configuration Table**. If the network is connected, the route is also added to **Current Active Route List**. If not, the route will be queued and added when the network is connected.

3.5.3 IP Filter

1. Click **1.3.3 IP Filter** in the operation menu.


Panasonic
SIP-GW4
Maintenance Utility
Operation Menu
IP Filter
1. Programming
1.1 Network Settings
1.1.1 WAN Interface <compulsory>
1.1.2 LAN Interface
1.2 SIP Settings
1.2.1 Channel & SIP Telephony <compulsory>
1.2.2 Voice Communication
1.2.3 NAT Traversal
1.2.4 Options
1.3 Advanced Settings (>>> Disable)
1.3.1 DHCP Server
1.3.2 Static Route
1.3.3 IP Filter
1.3.4 NAT Settings
1.3.5 Bandwidth
IP Filter Rules
No. Action Interface Input Interface Output Source IP Address/Mask[: Port] Destination IP Address/Mask[: Port] Protocol
1 Block Any Except LAN All addresses : All ports All addresses : 137 - 139 TCP/UDP Delete Edit Copy Down Up
2 Block Any Except LAN All addresses : All ports All addresses : 445 TCP/UDP Delete Edit Copy Down Up
3 Allow WAN(Fixed IP Address/DHCP) Any All addresses : 67 All addresses : All ports UDP Delete Edit Copy Down Up
4 Block Except LAN Any All addresses : All ports All addresses : 1 - 1023 TCP/UDP Delete Edit Copy Down Up
Add

In the **IP Filter Rules** table, several IP filter rules are registered as default. IP packets are checked against the IP filter rules in that order. If the IP packet matches a rule, the IP packet is blocked or allowed to pass according to the rule. If the IP packet does not match any rules, the IP packet is allowed to pass.

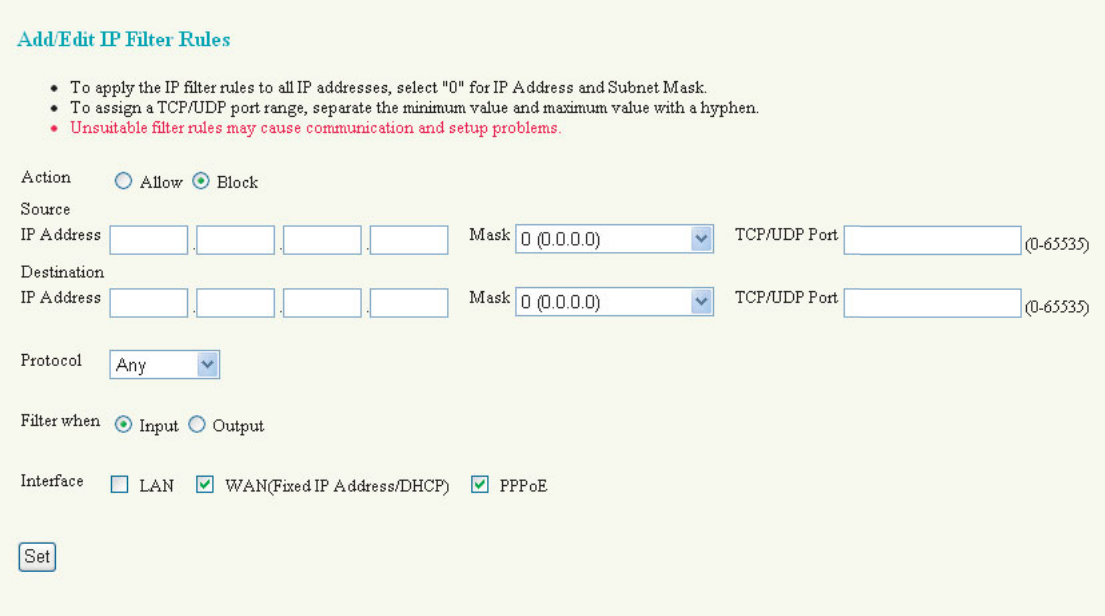
[Buttons in the table]

Button	Description
Delete	Deletes the IP filter rule.
Edit	Edits the IP filter rule.
Copy	Copies the IP filter rule. The copied rule can be edited to create a new rule.
Down	Lowers the priority level of the IP filter rule.
Up	Raises the priority level of the IP filter rule.

CAUTION

For security reasons, special care must be taken when configuring the IP Filter settings.

2. Click **Add** to add IP filter rules.
A maximum of 32 rules (including defaults) can be assigned to the table.



3. Assign each parameter referring to the descriptions below.

Parameter & Description		Default	Value Range
Action Specifies whether the IP packet is blocked or allowed to pass.		Block	Block, Allow
Source	**IP Address** Specifies the source IP address.	No default	Available source IP addresses*1
	Mask Specifies the source subnet mask address.	0 (0.0.0.0)	0, 8–32*1
	TCP/UDP Port*2 Specifies the range of the source port number to apply the filter rule.	No default	1–65535*3
Destination	**IP Address** Specifies the destination IP address.	No default	Available destination IP addresses*1
	Mask Specifies the destination subnet mask address.	0 (0.0.0.0)	Available destination subnet mask addresses*1
	TCP/UDP Port*2 Specifies the range of the destination port number to apply the filter rule.	No default	1–65535*3

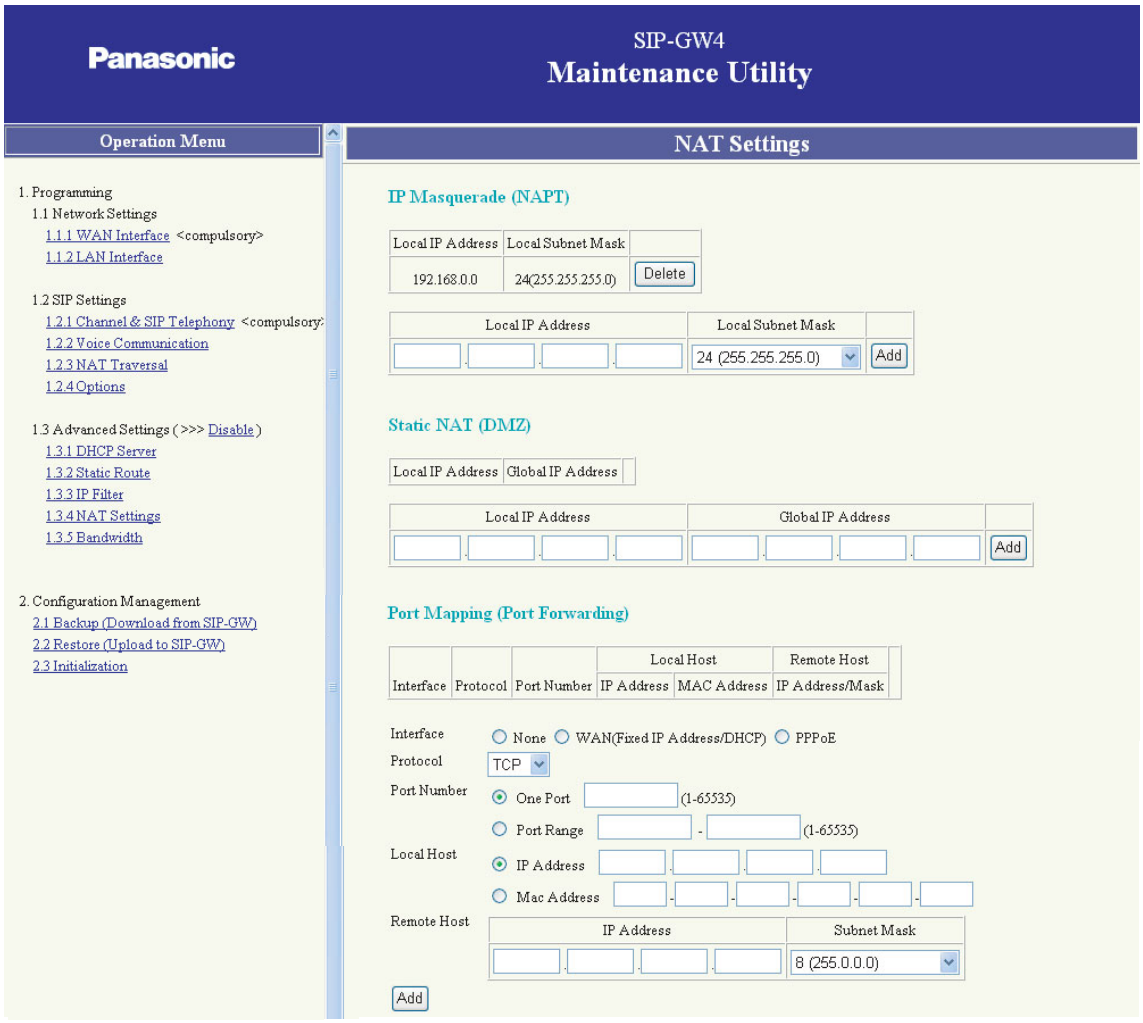
Parameter & Description	Default	Value Range
Protocol Specifies the protocol to which the IP filter rule is applied.	Any	Any, ICMP, IGMP, TCP, UDP, RSVP, OSPF, GRE
Filter When Specifies the direction of the IP packets (Input/ Output) to which the IP filter rule is applied.	Input	Input: IP filter rules are applied to IP packets that are received at the interface specified in **Interface**. Output: IP filter rules are applied to IP packets that are sent from the interface specified in **Interface**.
Interface Specifies the interface to which the IP filter rule is applied.	WAN (Fixed IP Address/DHCP Client), PPPoE	LAN, WAN (Fixed IP Address/ DHCP Client), PPPoE*4

*1: Enter "0 (0.0.0.0)" to apply the IP filter rules to all the IP packets.
*2: This setting is activated when "**TCP**", "**UDP**", or "**TCP/UDP**" is selected in **Protocol**.
*3: To specify the range, enter the lowest port number, hyphen and highest port number.
To apply the IP filter rules to all port numbers, enter "**0–65535**". "**0**" can only be entered in this case.
*4: It is possible to select multiple interfaces.
In **Interface** in the **IP Filter Rules** table, "**Any**" will be automatically displayed for the timing that is not selected in **Filter When**.

4. Click **Set**.
A confirmation screen is displayed, and the new setting is displayed in the **IP Filter Rules** table.

3.5.4 NAT Settings

1. Click **1.3.4 NAT Settings** in the operation menu.

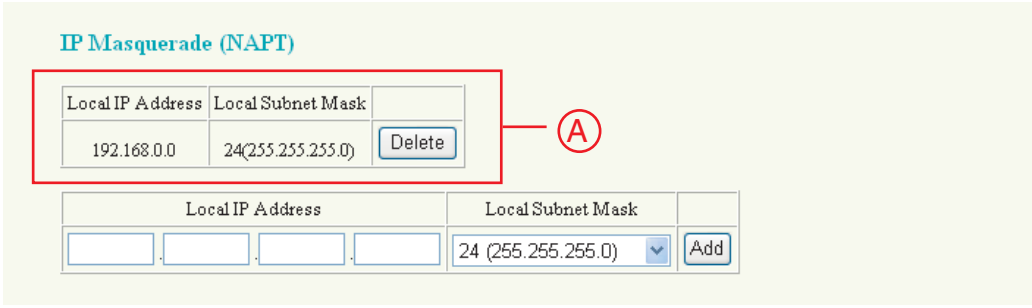


2. Assign the following items referring to the descriptions.
   - IP Masquerade (NAPT)
   - Static NAT (DMZ [Demilitarized Zone])
   - Port Mapping (Port Forwarding)
   - Private IP Packet Restriction to WAN
   - VPN Pass-through

IP Masquerade (NAPT)

IP Masquerade enables internal devices (e.g., PCs) on a LAN network to communicate with external devices on the WAN network by using the global IP address assigned to the WAN port.

Specify the local IP address of each internal device. After configuration is complete, the address information is added to the list (A).



1. Click **Delete** if you wish to delete the address information listed in that row.
2. Assign each parameter referring to the descriptions below.

Parameter & Description	Default	Value Range
Local IP Address Specifies the target local network address for address translation.	192.168.0.0	Available IP addresses
Local Subnet Mask Specifies the subnet mask address for the local IP address assigned above.	24 (255.255.255.0)	8–32

Notes

- When the IP address is changed in **3.3.2 LAN Interface**, it may be necessary to change the IP masquerade settings as well.
- Depending on the destination to which IP packets are sent, the IP address of the WAN port may be automatically selected as the local IP address.
- When two or more addresses are listed, an address that matches any one of the listed entries will be a target for address translation.

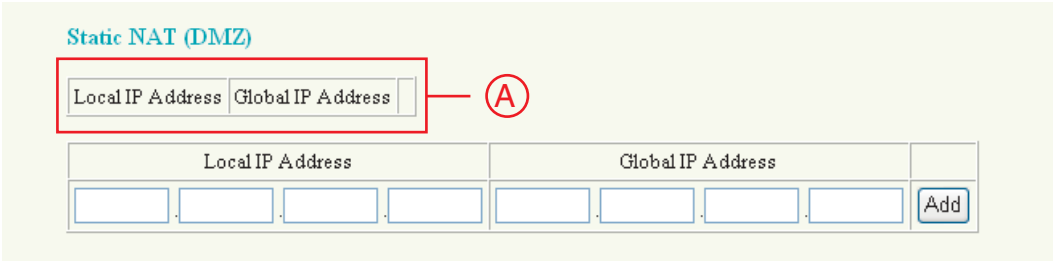
3. Click **Add**.
   A maximum of 8 sets of addresses (including defaults) can be assigned to the table.
   A confirmation screen is displayed.
4. Click **Back to [NAT Settings]** to return to the previous screen.

Static NAT (DMZ [Demilitarized Zone])

Specifies the IP addresses for address translation using Static NAT. After configuration is complete, the address information is added to the list (A).

CAUTION

If Static NAT is enabled, external devices on a WAN network can directly access internal devices on a LAN network. For security reasons, special care must be taken when configuring the Static NAT settings.



1. Click **Delete** if you wish to delete the address information listed in that row.
2. Assign each parameter referring to the descriptions below.

Parameter & Description	Default	Value Range
Local IP Address Specifies the target local IP address for address translation.	No default	Available IP addresses
Global IP Address Specifies the global IP address for address translation.	No default	Available IP addresses

3. Click **Add**.
   A maximum of 8 sets of addresses can be assigned to the table.

Port Mapping (Port Forwarding)

Port Mapping enables external devices on a WAN network to communicate with internal devices on a LAN network.

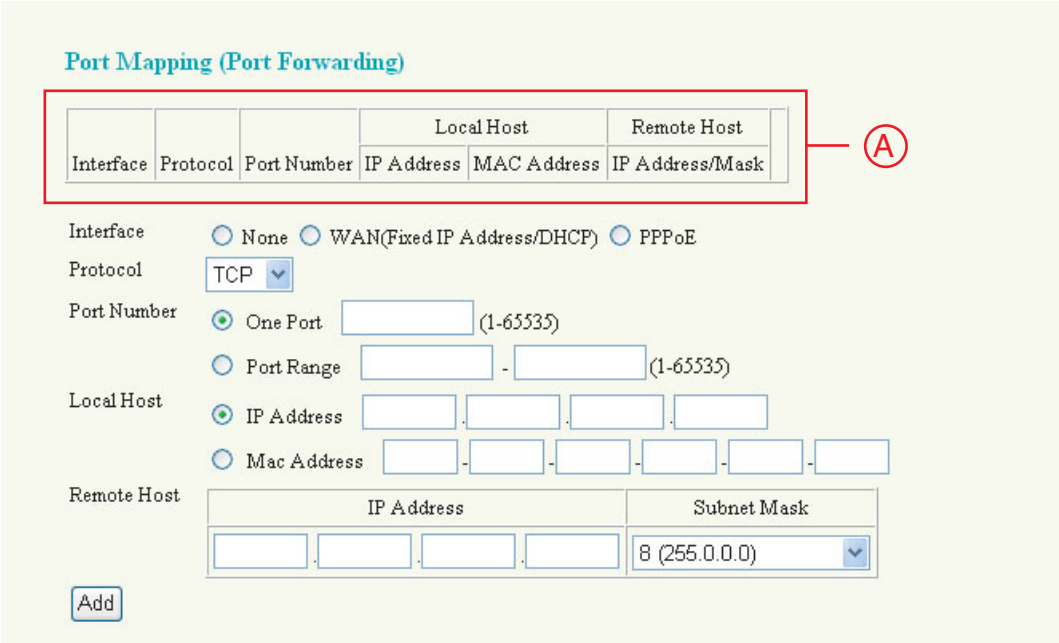
Specify the packet information to the WAN port and internal device (Host) information to which those packets will be transferred. After configuration is complete, the information is added to the list (A).

Note

When the list contains several entries, the packet information to the WAN port will be checked in the order of top to bottom.

CAUTION

If Port Mapping is enabled, external devices on a WAN network can directly access internal devices on a LAN network. For security reason, special care must be taken when configuring the Port Mapping settings.



1. Click **Delete** if you wish to delete the port information listed in that row.
2. Assign each parameter referring to the descriptions below.

Parameter & Description		Default	Value Range
Interface Specifies the target interface for address translation.		No default	None, WAN (Fixed IP Address/DHCP Client), PPPoE
Protocol[*1] Specifies the target protocol for address translation.		TCP	TCP, UDP, ESP, GRE
Port Number[*1] Specifies the effective port numbers.		One Port	One Port: Enter a specific port number Port Range: Enter a range of port numbers
Local Host Specifies the local host by selecting either an IP address or a MAC address.		IP Address	IP Address, MAC Address[*2]
Remote Host[*3] Specifies the target remote host for address translation.	**IP Address** Specifies the IP address for the remote host.	No default	Available IP addresses
	Subnet Mask Specifies the subnet mask address for the remote host.	8 (255.0.0.0)	8–32

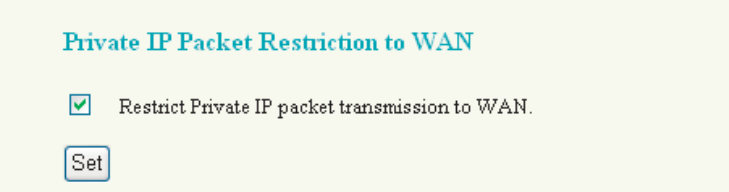
*1: The type of VPN pass-through specified in **VPN Pass-through** determines the values to be entered, as follows:
- IPSec
  - Protocol: **UDP**; Port number: **500**
  - Protocol: **ESP**; Port number: Not required
- PPTP
  - Protocol: **TCP**; Port number: **1723**
  - Protocol: **GRE**; Port number: Not required

*2: If a DHCP server is assigned, a MAC address must also be assigned (refer to **3.5.1 DHCP Server**).
*3: If no remote host is assigned, IP packets that are sent from all the remote hosts will be targets for address translation.

3. Click **Add**.
   A confirmation screen is displayed.
4. Click **Back to [NAT Settings]** to return to the previous screen.

Private IP Packet Restriction to WAN

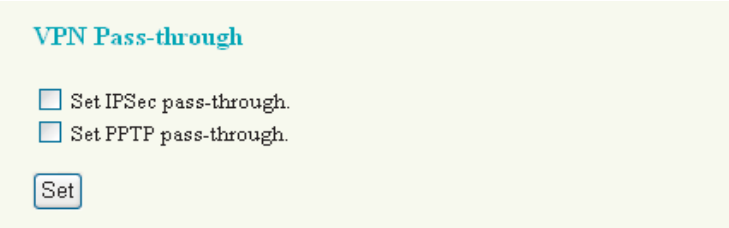
Specifies whether to block IP packets that have private addresses as a source IP address to be sent to the WAN port without NAT.



1. Check the box to block IP packets.
2. Click **Set**.
   A confirmation screen is displayed.
3. Click **Back to [NAT Settings]** to return to the previous screen.

VPN Pass-through

Specifies the type of VPN pass-through, IPSec or PPTP.



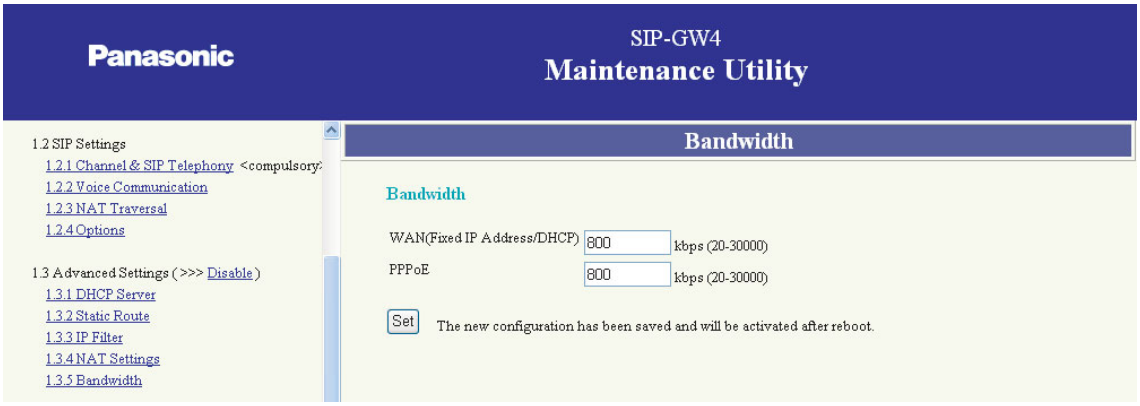
1. Check the desired box.
2. Click **Set**.

Notes

- The new setting must be followed by a reboot to become effective (refer to "3.8.1 Reboot").
- It is necessary to configure the **Port Mapping (Port Forwarding)** settings to allow access from the Internet.

3.5.5 Bandwidth

1. Click **1.3.5 Bandwidth** in the operation menu.



   Specify the maximum amount of bandwidth for VoIP (voice, data) communication on the network. If it requires more bandwidth than is set here, packets will not be sent. In that case, voice packets (RTP packets) are prioritised and data to be sent via the LAN will be discarded. The bandwidth restriction set here does not influence IP packets that are received at the interface. Set the actual amount of bandwidth (refer to "A1.2 Bandwidth Requirements").

2. Assign each parameter referring to the descriptions below.

Parameter & Description	Default	Value Range
WAN (Fixed IP Address/DHCP Client) Specifies the bandwidth for the WAN port. Applies to connection by a fixed IP address or DHCP Client.*1	800	20–30000
PPPoE Specifies the bandwidth for PPPoE. Applies to connection by PPPoE.*2	800	20–30000

*1: When **Fixed IP Address** or **DHCP Client** is selected as the connection method in **WAN Interface**.
*2: When **PPPoE** is selected as the connection method in **WAN Interface**.

3. Click **Set**.
   A confirmation screen is displayed.
4. The new settings must be followed by a reboot to become effective.
   Do one of the following:
   – Click **Reboot Now** to make the changes effective now.
   – Click **Reboot Later** to return to the previous screen.

Note

After reboot, the card will be disconnected from the network for a number of seconds.

3.6 Configuration Management

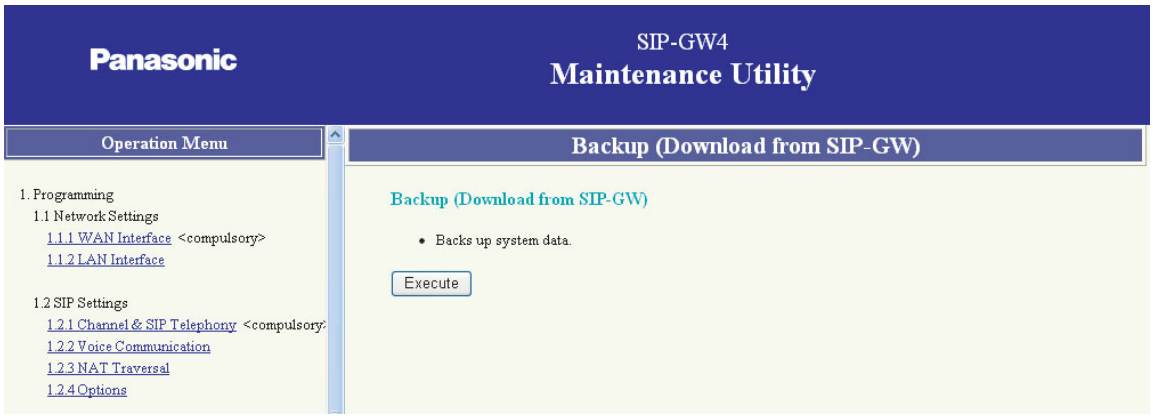
3.6.1 Backup (Download from SIP-GW4)

The following is the procedure for downloading the configuration file from the SIP-GW4 card for backup.

Note

If the configuration file is backed up during VoIP communication, it may degrade the speech quality. Backup procedures should be avoided during calls.

1. Click **2.1 Backup (Download from SIP-GW)** in the operation menu.



2. Click **Execute**.
   The download dialogue box is displayed.
3. Click **Save**.
   The Save dialogue box is displayed. To cancel downloading, click **Cancel**.
4. Navigate to the folder in which you want to save the file.
5. Enter a file name (default: "**config**").
6. Click **Save**.

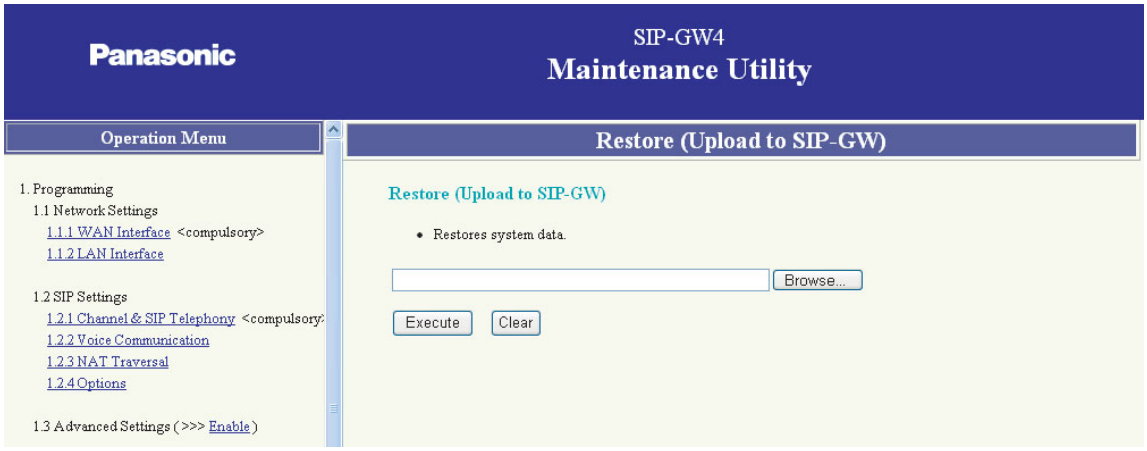
3.6.2 Restore (Upload to SIP-GW4)

The following is the procedure for restoring the backup file to the SIP-GW4 card.

Note

If the backup file is restored during VoIP communication, it may degrade the speech quality. Restoring procedures should be avoided during calls.

1. Click **2.2 Restore (Upload to SIP-GW)** in the operation menu.



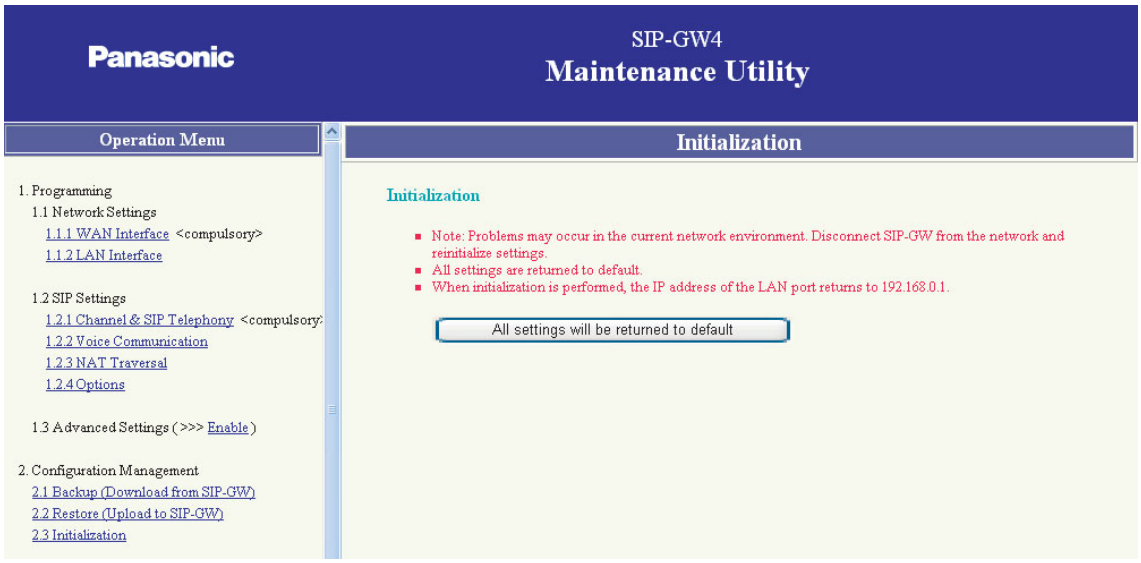
2. Click **Browse** and select the file to be restored.
3. Click **Execute**.
   A confirmation screen is displayed. To cancel uploading, click **Clear**.
4. The new settings must be followed by a reboot to become effective.
   Do one of the following:
   – Click **Reboot Now** to make the new setting effective now.
   – Click **Reboot Later** to return to the previous screen.

Note

After reboot, the card will be disconnected from the network for a number of seconds.

3.6.3 Initialization

1. Click **2.3 Initialization**.


Panasonic
SIP-GW4
Maintenance Utility
Operation Menu
Initialization
1. Programming
1.1 Network Settings
1.1.1 WAN Interface <compulsory>
1.1.2 LAN Interface
1.2 SIP Settings
1.2.1 Channel & SIP Telephony <compulsory>
1.2.2 Voice Communication
1.2.3 NAT Traversal
1.2.4 Options
1.3 Advanced Settings (>>> Enable)
2. Configuration Management
2.1 Backup (Download from SIP-GW)
2.2 Restore (Upload to SIP-GW)
2.3 Initialization
Initialization
Note: Problems may occur in the current network environment. Disconnect SIP-GW from the network and reinitialize settings.
All settings are returned to default.
When initialization is performed, the IP address of the LAN port returns to 192.168.0.1.
All settings will be returned to default

2. Click **All settings will be returned to default**.
   A confirmation screen is displayed.
3. Click **Execute**.
   To cancel the initialisation, click **Cancel**.

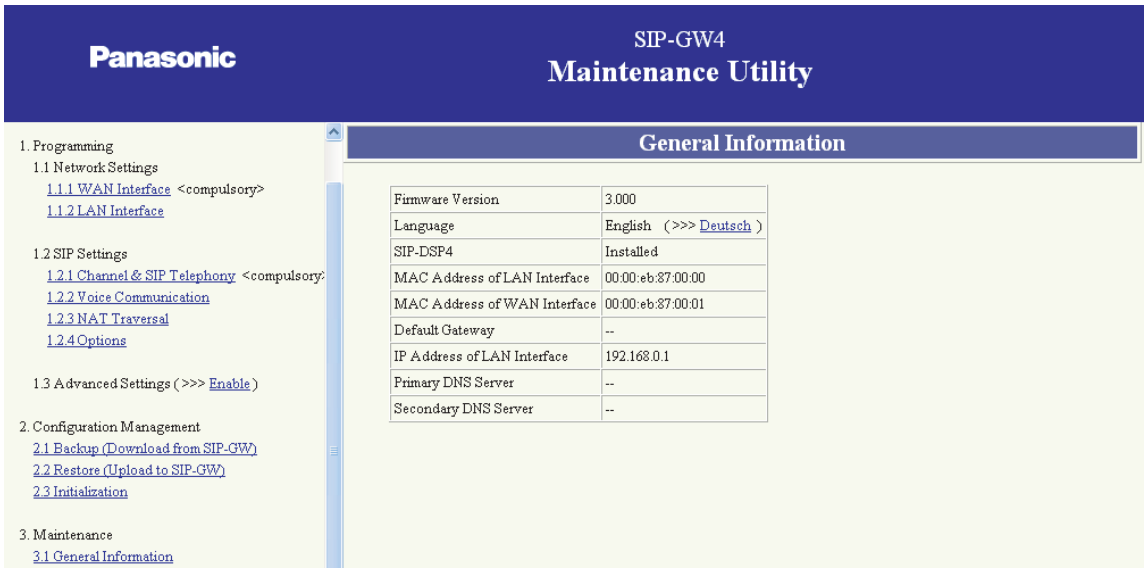
Notes

- After initialisation, the card will automatically be rebooted.
- After initialisation, the IP address of the LAN port is changed to "**192.168.0.1**", and the card and PCs may become unable to communicate. In that case, change the TCP/IP settings of the PCs.

3.7 Maintenance

3.7.1 General Information

Click **3.1 General Information**.

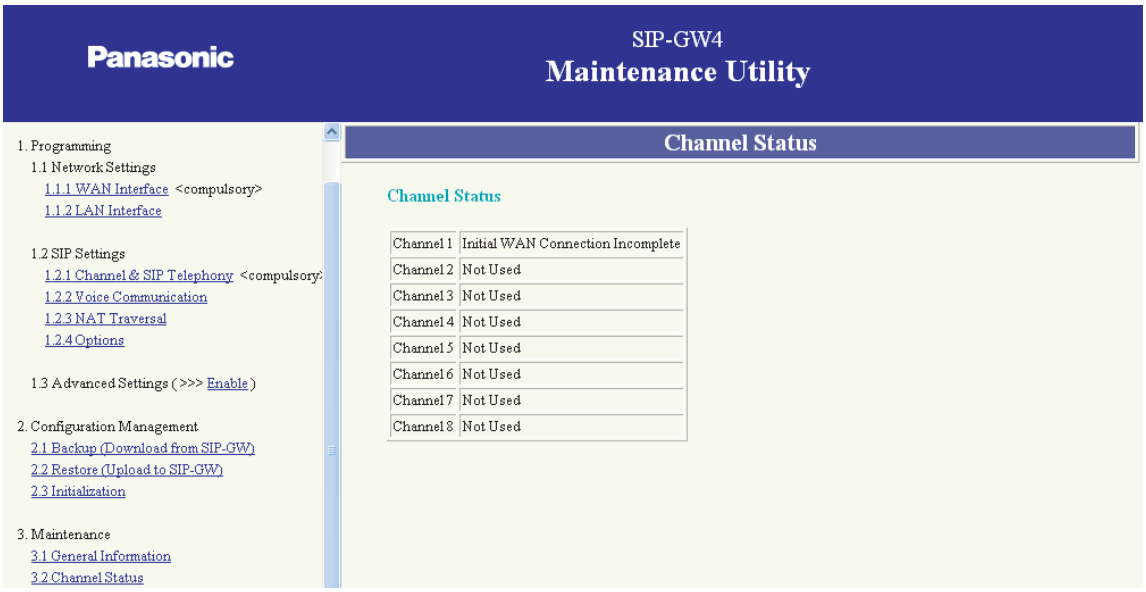


Note

You can switch the displayed. Click "Deutsch" for German.

3.7.2 Channel Status

1. Click **3.2 Channel Status**.



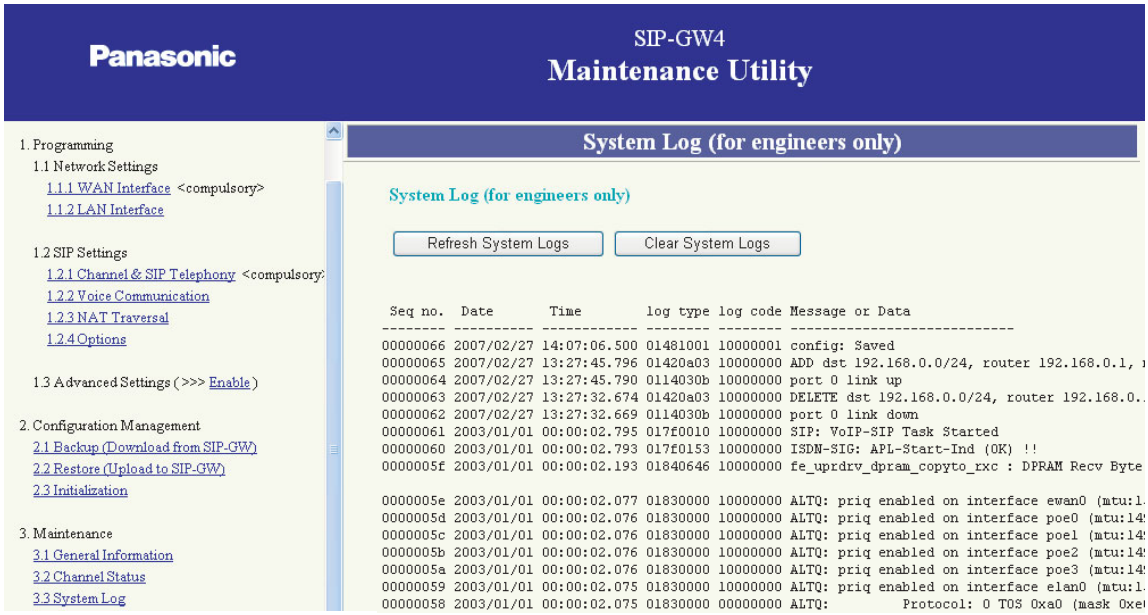
2. Confirm the status of each channel referring to the descriptions below.

Status	Description
Not Used	The settings for the channel are not configured, or **Not Used** is selected in **Channel Settings**. Refer to "3.4.1 Channel & SIP Telephony".
Initial WAN Connection Incomplete	WAN connection is incomplete. Check the probable causes below and make the necessary corrections: • Programming for the WAN interface is incorrect. Refer to "3.3.1 WAN Interface". • The WAN port is not connected to the DCE (e.g., ADSL Modem) correctly. Refer to "2.2.2 WAN Port Connection". • There is a malfunction on the WAN. For more information, consult your network administrator.
SIP Registration Failed	After WAN connection is complete, registration to the SIP server failed. Check the probable causes below and make the necessary corrections: • The settings for the channel are incorrect. Refer to "3.4.1 Channel & SIP Telephony". • The WAN port is not connected to the DCE (e.g., ADSL Modem) correctly. Refer to "2.2.2 WAN Port Connection". • There is a malfunction on the WAN. For more information, consult your network administrator.
Idle	WAN connection and registration to the SIP server are complete. The channel is available and in standby status.

Status	Description
Busy	WAN connection and registration to the SIP server are complete. The channel is being used.

3.7.3 System Log (for engineers only)

1. Click **3.3 System Log** in the operation menu.

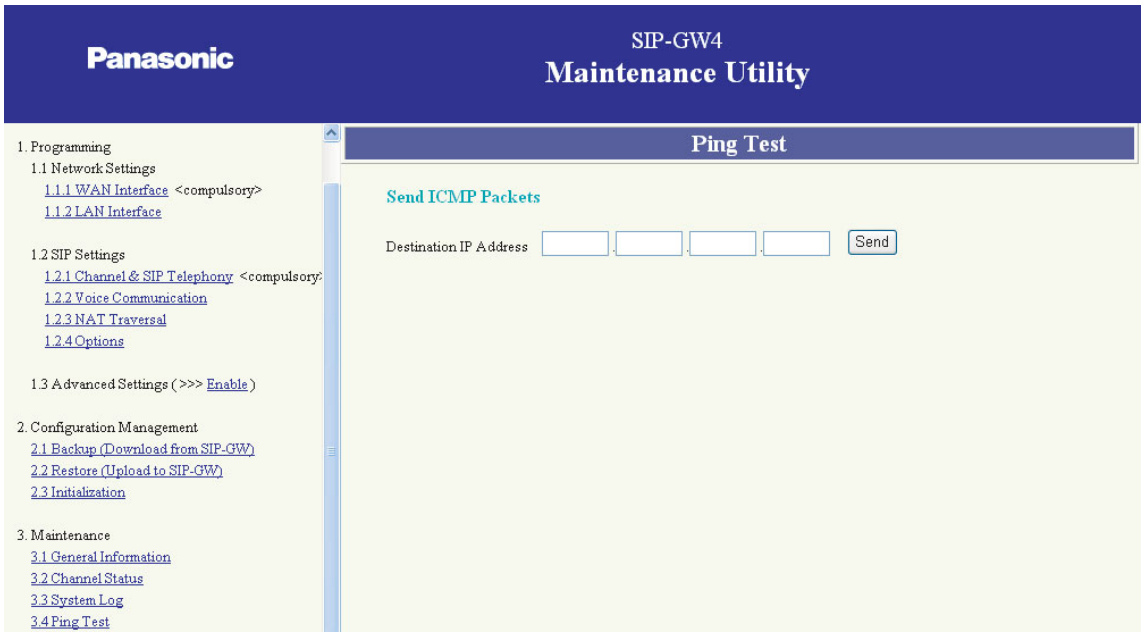

Panasonic
SIP-GW4
Maintenance Utility
1. Programming
1.1 Network Settings
1.1.1 WAN Interface <compulsory>
1.1.2 LAN Interface
1.2 SIP Settings
1.2.1 Channel & SIP Telephony <compulsory>
1.2.2 Voice Communication
1.2.3 NAT Traversal
1.2.4 Options
1.3 Advanced Settings (>>> Enable)
2. Configuration Management
2.1 Backup (Download from SIP-GW)
2.2 Restore (Upload to SIP-GW)
2.3 Initialization
3. Maintenance
3.1 General Information
3.2 Channel Status
3.3 System Log
System Log (for engineers only)
System Log (for engineers only)
Refresh System Logs
Clear System Logs
Seq no. Date Time log type log code Message or Data
00000066 2007/02/27 14:07:06.500 01481001 10000001 config: Saved
00000065 2007/02/27 13:27:45.796 01420a03 10000000 ADD dst 192.168.0.0/24, router 192.168.0.1,
00000064 2007/02/27 13:27:45.790 0114030b 10000000 port 0 link up
00000063 2007/02/27 13:27:32.674 01420a03 10000000 DELETE dst 192.168.0.0/24, router 192.168.0.
00000062 2007/02/27 13:27:32.669 0114030b 10000000 port 0 link down
00000061 2003/01/01 00:00:02.795 017f0010 10000000 SIP: VoIP-SIP Task Started
00000060 2003/01/01 00:00:02.793 017f0153 10000000 ISDN-SIG: APL-Start-Ind (OK) !!
0000005f 2003/01/01 00:00:02.193 01840646 10000000 fe_uprdrv_dpram_copyto_rxc : DPRAM Recv Byte
0000005e 2003/01/01 00:00:02.077 01830000 10000000 ALTQ: priq enabled on interface ewan0 (mtu:1
0000005d 2003/01/01 00:00:02.076 01830000 10000000 ALTQ: priq enabled on interface poe0 (mtu:14
0000005c 2003/01/01 00:00:02.076 01830000 10000000 ALTQ: priq enabled on interface poe1 (mtu:14
0000005b 2003/01/01 00:00:02.076 01830000 10000000 ALTQ: priq enabled on interface poe2 (mtu:14
0000005a 2003/01/01 00:00:02.076 01830000 10000000 ALTQ: priq enabled on interface poe3 (mtu:14
00000059 2003/01/01 00:00:02.075 01830000 10000000 ALTQ: priq enabled on interface elan0 (mtu:1
00000058 2003/01/01 00:00:02.075 01830000 00000000 ALTQ: Protocol: 0 TOS 0xa0 (mask 0xe

Notes

- To update the displayed system log information, click **Refresh System Logs**.
- To clear all system log information, click **Clear System Logs**.
- If the number of recorded system logs exceeds the limit, the oldest system logs will be overwritten.

3.7.4 Ping Test

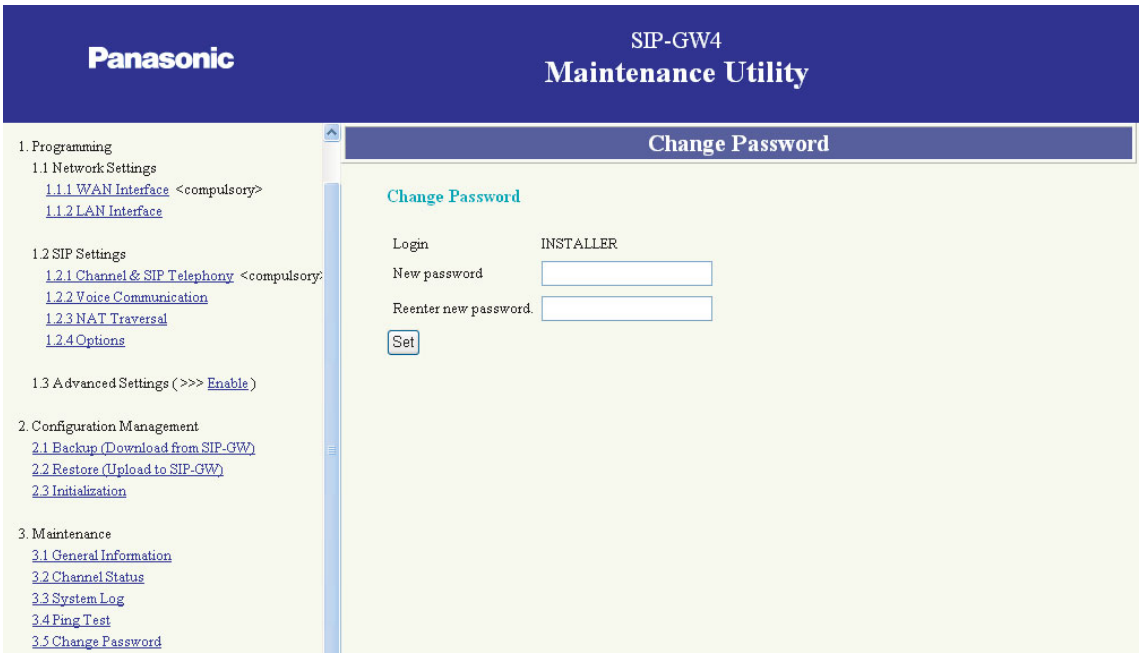
1. Click **3.4 Ping Test** in the operation menu.



2. Enter the IP address of the ping destination in the **Destination IP Address** box.
3. Click **Send**.
   After a few seconds, the ping test result will be displayed.

3.7.5 Change Password

1. Click **3.5 Change Password** in the operation menu.



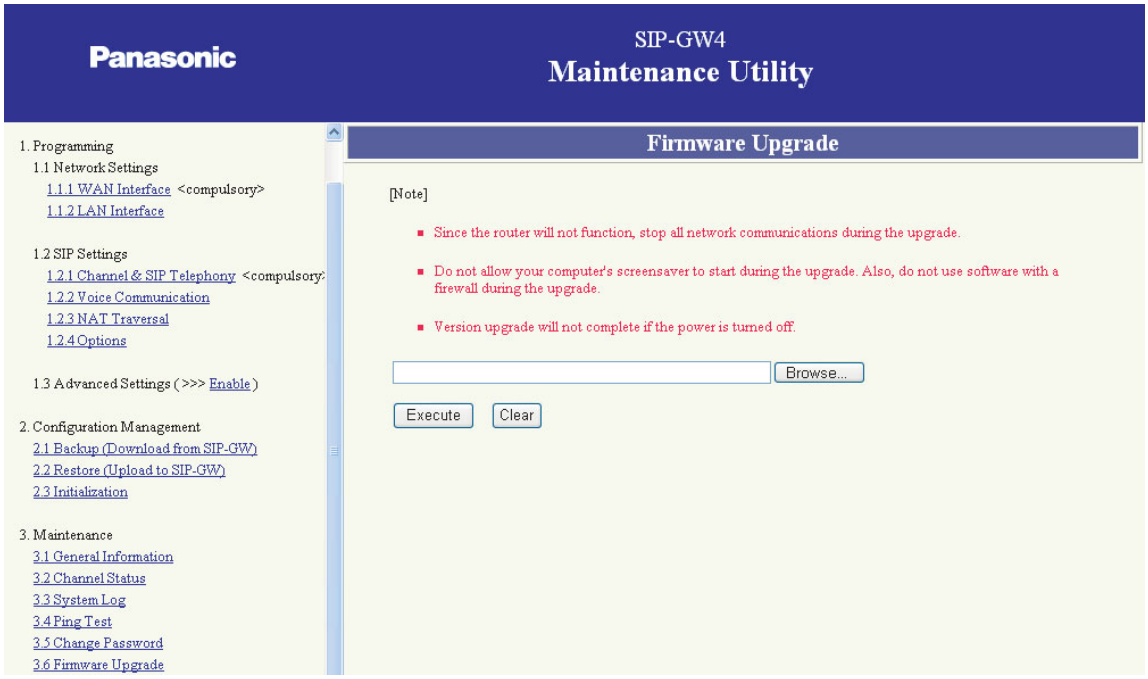
2. Assign a new log-in password in the **New password** box.
3. Assign the same password in the **Reenter new password** box.
4. Click **Set**.
   A confirmation screen is displayed.

Notes

- A maximum of 16 alphanumeric characters can be assigned for the password.
- The password is case sensitive.
- For security, it is recommended to change the password periodically.

3.7.6 Firmware Upgrade

1. Click **3.6 Firmware Upgrade**.



2. Click **Browse** to select the firmware file.
3. Click **Execute**.
   To clear the entry, click **Clear**.

   Notes

   - Do not turn off the power to the PBX during the upgrade.
   - Do not change the card status (OUS/INS) during the upgrade.

4. The new setting must be followed by a reboot to become effective.
   Do one of the following:
   – Click **Reboot Now** to make the changes effective now.
   – Click **Reboot Later** to restore or backup the configuration file. For details, refer to the steps below.

   How to restore the configuration file

   1. Click **Browse** and select the file to be restored.
   2. Click **Execute**.
      A confirmation screen is displayed. To clear the entry, click **Clear**.
   3. The new setting must be followed by a reboot to become effective.
      Do one of the following:
      – Click **Reboot Now** to make the new setting effective now.
      – Click **Reboot Later** to return to the previous screen.

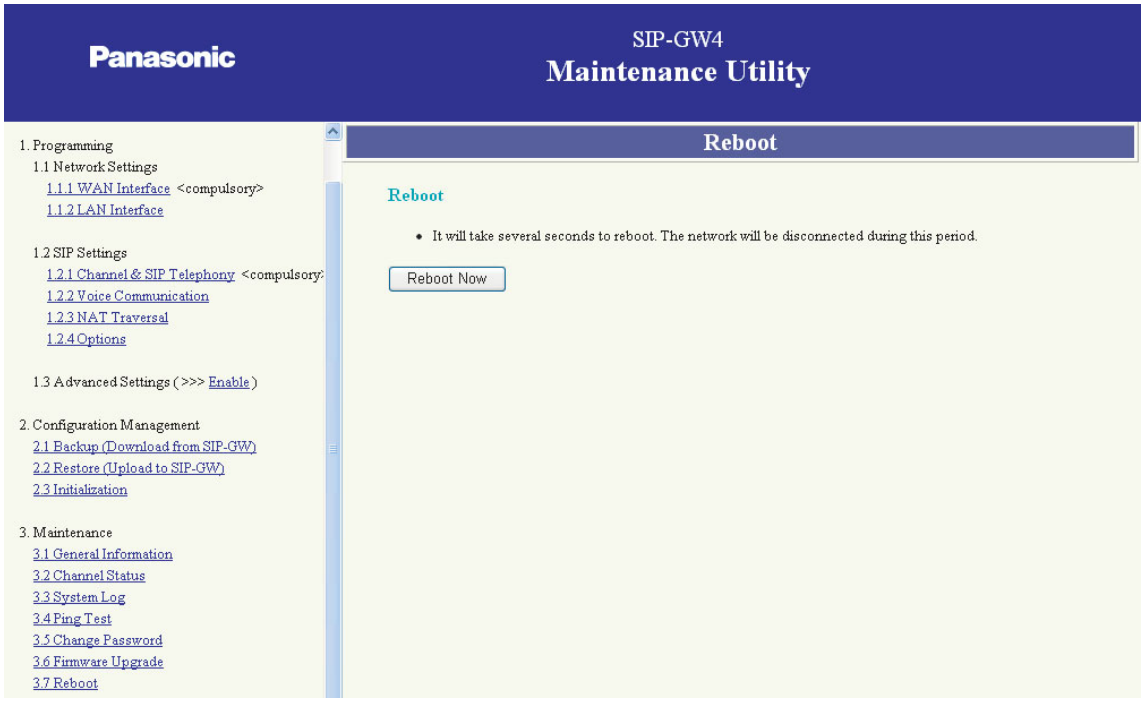
How to backup the configuration file

1. Click **Execute**.
   The download dialogue box is displayed.
2. Click **Save**.
   The Save dialogue box is displayed. To cancel downloading, click **Cancel**.
3. Navigate to the folder in which you want to save the file.
4. Enter a file name (default: "**config**").
5. Click **Save**.

3.8 Others

3.8.1 Reboot

1. Click **3.7 Reboot** in the operation menu.



2. Click **Reboot Now**.
   A confirmation screen is displayed.
3. Click **Execute**.
   After reboot, the card will be disconnected from the network for a number of seconds. Click **Cancel** to return to the previous screen.

Section 4

Programming the PBX

4.1 Programming the PBX

Depending on the conditions in which the SIP-GW4 card is used, programming may be required for the PBX using the KX-TDA Maintenance Console (PC programming software of the PBX):

Making Calls

With the default settings, the PBX sends calls to the SIP VoIP network 10 seconds after an extension user completes dialling the telephone number.

Through programming the PBX, calls can be sent to the SIP VoIP network from the PBX as soon as dialling is completed. The settings can be changed in the following two ways:

1) Pressing the # key

The PBX sends calls to the SIP VoIP network when the # key is pressed after dialling the telephone number.

Programming Location of the KX-TDA Maintenance Console

2. System—9. System Options—Option 2—ISDN en Block Dial—[#] as End of Dial for en Bloc mode

Note

The programming above is same for ISDN.

2) Dialling Plan

The PBX sends calls to the SIP VoIP network when the dialled number is a preprogrammed telephone number.

Programming Location of the KX-TDA Maintenance Console

- 3. Group—1. Trunk Group—1. TRG Settings—Main—Dialling Plan Table
- 6. Feature—7. Dialling Plan

Caller ID Modification

When receiving calls via the SIP VoIP network, caller ID may not be displayed properly.
In that case, the caller ID can be edited through programming the PBX.

Programming Location of the KX-TDA Maintenance Console

- 3. Group—1. Trunk Group—1. TRG Settings—Main—Caller ID Modification Table
- 6. Feature—2. Caller ID Modification—Caller ID Modification

For details about programming each setting, refer to the PC Programming Manual of the PBX.

Appendix A
Guidance for VoIP Installation

A1 Important Notice for Subscription and Installation

A1.1 Firewall Requirements

If the VoIP network contains a firewall, you must configure the firewall to allow VoIP packets to pass through certain ports of the ports listed below without being blocked by filtering. The ports for which you need to configure the firewall may vary depending on the network conditions.
For more information, consult your network administrator.

[IP Packets to SIP-GW4 Card]

Port	TCP/UDP	Default Port No.
SIP Client Port	UDP	5060
STUN Client Port	UDP	3478
RTP/RTCP Port	UDP	5004–5103
DNS Client Port	UDP	53

[IP Packets from SIP-GW4 Card]

Port	TCP/UDP	Default Port No.
Proxy Server Port	UDP	5060
Registrar Server Port	UDP	5060
STUN Server Port	UDP	3478
DNS Server Port	UDP	53

Router Requirements

- Port Forwarding:

  When a SIP-GW4 card is located under a NAT router, and when incoming packets are routed to a SIP Client port or RTP/RTCP port indicated in the **[IP Packets to SIP-GW4 Card]** table above, it may be required to set the NAT router so that it forwards the incoming packets to the IP address of the SIP-GW4 card.
- SIP-NAT Feature:

  When a SIP-GW4 card is located under a NAT router that supports the SIP-NAT feature*, it is recommended to disable this feature.

  *: When NAT is enabled, the router translates the IP address stored in the IP header and the port number stored in the UDP header. When SIP-NAT is enabled, the router also translates the IP address and port number stored in SIP messages.

A1.2 Bandwidth Requirements

When using the SIP-GW4 card, you must ensure that the WAN has enough bandwidth to support VoIP communications. Refer to the table below and ensure that the sum of the required bandwidth for each channel is smaller than the amount the WAN (e.g., ADSL network) can provide.

Note that the amount in the table is only a guide. Subscribe to a network that has enough bandwidth. If the amount of bandwidth required for VoIP communications is larger than what the network can accommodate, speech quality will be compromised.

Note

If you use an ADSL network, note that it has a narrow bandwidth for outgoing IP packets. Specify the bandwidth of the ADSL network for outgoing IP packets in "3.5.5 Bandwidth".

Required Bandwidth for Each Channel

The required bandwidth depends on what combination of CODECs and packet sending interval is used. Keep in mind the following points about the type of CODEC and packet sending interval, in terms of the speech quality:

- The speech quality of the CODECs varies as follows: G.711 (High), G.729 (Low)
- The shorter the packet sending interval, the higher the speech quality.
- The higher the speech quality the SIP-GW4 card provides, the more bandwidth the WAN requires.

CODEC	Packet Sending Interval				
	20 ms	30 ms	40 ms	50 ms	60 ms
G.711	90.4 kbps	81.6 kbps	77.2 kbps	74.6 kbps	72.8 kbps
G.729	34.4 kbps	25.6 kbps	21.2 kbps	18.6 kbps	16.8 kbps

Appendix B

Initialisation of the SIP-GW4 Card

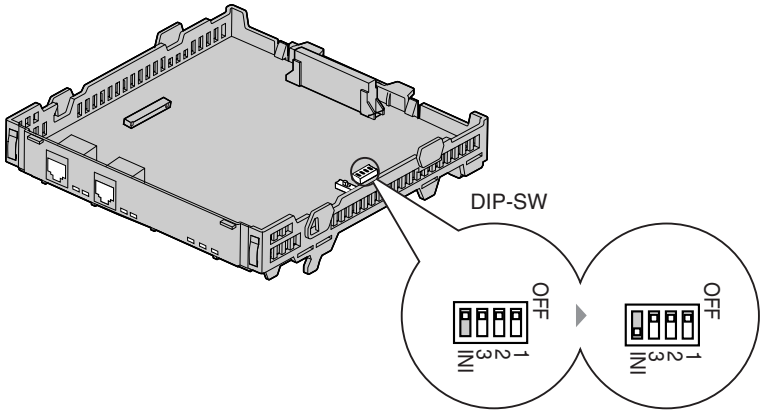
B1 Initialising the SIP-GW4 Card

If you have forgotten, for example, the IP address or log-in password you set for the SIP-GW4 card, follow the procedure below to return the settings of the card to the factory default.

Note

Resetting the card will restore all settings, not just the IP address and log-in password, to the factory default.

1. Slide the Initialise Switch on the card to the "INI" position, and then turn on the power to the PBX.



2. To start the SIP-GW4 Maintenance Utility, log in with the default IP address, user ID, and password from the PC connected to the card (refer to "3.2.2 Starting the SIP-GW4 Maintenance Utility").
3. Open "**2.3 Initialization**" from the menu and execute initialisation (refer to "3.6.3 Initialization").
4. After initialisation is complete, return the Initialise Switch to the "OFF" position.

Note

Ensure that the Initialise Switch is returned to the "OFF" position after initialisation is complete.

Index

Numerics

4-Channel SIP Trunk Card (KX-TDA3450) 12
4-Channel VoIP DSP Card (KX-TDA3451) 15

B

Backup (Download from SIP-GW4) 61
Bandwidth 60
Bandwidth Requirements 77

C

Cable Connection 18
Change Password 69
Channel & SIP Telephony 34
Channel Settings, Channel & SIP Telephony 34
Channel Settings, NAT Traversal 43
Channel Status 65
Configuration Management 61
Connecting to a Switching Hub, LAN Port 19
Connecting to a Switching Hub, WAN Port 20

D

Data Circuit Terminating Equipment (DCE) 20
DHCP Server 49
DNS (Domain Name System) 7
DNS Server 7

F

Ferrite Core 14
Firewall Requirements 76
Firmware Upgrade 70
Fixed IP Address Configuration, WAN Interface 31

G

General Information, Maintenance 64
Guidance for VoIP Installation 75

I

Important Notice for Subscription and Installation 76
Indication Light (LED) 13
Information about IP Telephony Service 6
Initialisation, Configuration File 63
Initialisation, SIP-GW4 Card 80
Initialise Switch 80
Installation 12
Installing the SIP-GW4 Card, Procedure Overview 22
IP Filter 52
IP Masquerade (NAPT), NAT Settings 55
ISP (Internet Service Provider) 7
ITSP (Internet Telephony Service Provider) 6

K

KX-TDA3450 SIP-GW4 Card 12
KX-TDA3451 SIP-DSP4 Card 15

L

LAN Interface 33
LAN Port Connection 18
Local Port Settings 45

M

Maintenance 64

N

Names and Locations, Installation 12
NAT Settings 55
NAT Traversal 8, 43

O

Options 45

P

Ping Test 68
Port Mapping (Port Forwarding), NAT Settings 57
PPPoE Configuration, WAN Interface 29
Preparations 23
Preparing the PC 23
Private IP Packet Restriction to WAN, NAT Settings 59
Procedure Overview 22
Programming the PBX 74
Programming, Advanced Settings 46
Programming, Network Settings 28
Programming, SIP Settings 34

R

Reboot 72
Required Bandwidth for Each Channel 77
Restore (Upload to SIP-GW4) 62
Router Requirements 76

S

SBC (Session Border Controller) 9
Select Connection, WAN Interface 28
SIP Telephony Basic Settings, Channel & SIP Telephony 35
SIP Telephony Detailed Settings, Channel & SIP Telephony 37
SIP-DSP4 Card (KX-TDA3451) 15
SIP-GW4 Card (KX-TDA3450) 12
SIP-GW4 Connection Outline 6
Specifications 10
Starting the SIP-GW4 Maintenance Utility 27
Static NAT (DMZ), NAT Settings 56
Static Route 51
STUN 8
STUN Server 8
System Log (for engineers only) 67
System Requirements 23

V

Voice Communication 41
VPN Pass-through, NAT Settings 59

W

WAN Interface 28
WAN Port Connection 20

Panasonic Communications Co., Ltd.
1-62, 4-chome, Minoshima, Hakata-ku, Fukuoka 812-8531, Japan

Copyright:
This material is copyrighted by Panasonic Communications Co., Ltd., and may be reproduced for internal use only. All other reproduction, in whole or in part, is prohibited without the written consent of Panasonic Communications Co., Ltd.

© 2007 Panasonic Communications Co., Ltd. All Rights Reserved.

PSQX4474XA KK0407TE2048